

## MEMORANDUM

**DATE:** July 10, 2014

**TO:** Mr. Robert S. Korff  
Mark Investments, Inc.  
54 Jaconnet Street, Suite 203  
Newton, MA 02461

**FROM:** Robert J. Michaud, P.E. – Managing Principal  
Daniel A. Dumais, E.I.T. – Senior Transportation Engineer

**RE:** **Proposed CVS Pharmacy**  
**631, 653 & 655 Mount Auburn St/ 268 Arlington St – Watertown, Massachusetts**

---

MDM Transportation Consultants, Inc. (MDM) has prepared this traffic impact study (TIS) for a proposed CVS pharmacy to be located at 631, 653 & 655 Mount Auburn Street/268 Arlington Street in Watertown, Massachusetts. This memorandum describes existing (baseline) traffic conditions for area roadways and key study intersections, trip generation characteristics of the project and provides a qualitative assessment of incremental traffic impacts of the site.

Key findings of the traffic assessment are as follows:

- *Site Traffic Generation.* The proposed CVS development will replace existing gasoline/service station, office uses, and an Elks Club at the Site, resulting in a small net estimated increase of only 5 vehicle-trips during the weekday morning peak hour, a 39 vehicle-trip increase during the weekday evening peak hour and a 51 vehicle-trip increase on a Saturday Midday peak hour. These trip increases will not materially impact traffic operations on area roadways and represent fewer than 20 new vehicles per hour on Mt. Auburn Street or Arlington Street, and in the case of Wells Avenue represents up to 46 vehicles per hour (less than one vehicle per minute that are destined to Mount Auburn Street or Arlington Street to the north of Mount Auburn Street). These trip increases fall within normal day-to-day traffic fluctuations in the area.

- *Mt. Auburn Street/Arlington Street Operations.* The signalized Mount Auburn Street/Arlington Street intersection generally operates below capacity at Level-of-service (LOS) D or better operations during the weekday morning and Saturday midday peak hours under Existing (Baseline) conditions. Longer delays (LOS F) are experienced during the weekday evening peak hours. Negligible impact to intersection operations is anticipated as a result of the proposed site redevelopment.
- *Safety Characteristics.* No immediate safety countermeasures are required at the site driveways or the adjacent Mount Auburn Street/Arlington Street intersection based on historic crash data and trends. Proposed Site access improvements will *reduce* conflicts at the adjacent Mount Auburn Street signal by eliminating the two (2) site driveway along Arlington Street, removal of the Mount Auburn Street driveway, and installing a channelizing island to promote right-turn only egress movements onto Arlington Street.
- *Mitigation.* Review of signal operations at Mt. Auburn Street/Arlington Street indicates malfunctioning pedestrian pushbuttons. Recognizing the importance of controlled crossings and to facilitate pedestrian access to/from the Site, the Proponent will replace malfunctioning equipment at the signal as part of its development program.

In summary, MDM finds that the proposed use will generate only a nominal increase in trip activity at the Site that will represent fewer than 20 new vehicles per hour on Mt. Auburn Street or Arlington Street, and in the case of Wells Avenue represents up to 46 vehicles per hour (less than one vehicle per minute that are destined to Mount Auburn Street or Arlington Street to the north of Mount Auburn Street). These additional trips fall within normal day-to-day fluctuations in area traffic and will not materially impact traffic operations. Proposed access improvements will *reduce* potential vehicular conflict points along Mount Auburn Street and Arlington Street relative to existing conditions. Proponent-sponsored improvements will also include repair of pedestrian pushbutton equipment at the adjacent signal at Mt. Auburn Street/Arlington Street that will allow for controlled pedestrian crossings to/from the Site.

## PROJECT DESCRIPTION

### *Existing Conditions*

The existing site consists of an active 2,982± sf Citizen Bank (631 Mount Auburn Street), an active 4-pump (2 fueling position) gas station with a 1,200± sf automobile service center (655 Mount Auburn Street), a vacant 10,800± sf office building (653 Mount Auburn Street), and a 8,960± sf Elks Club – Watertown (268 Arlington Street) in Watertown, MA. The site location relative to area roadways is shown in **Figure 1**.

Access to the site is currently provided via a single (1) full access/egress driveway along Mount Auburn Street, three (3) full-access driveways along Arlington Street, and two (2) right-in/ right-out driveways along the rear portion of the property to Wells Avenue.

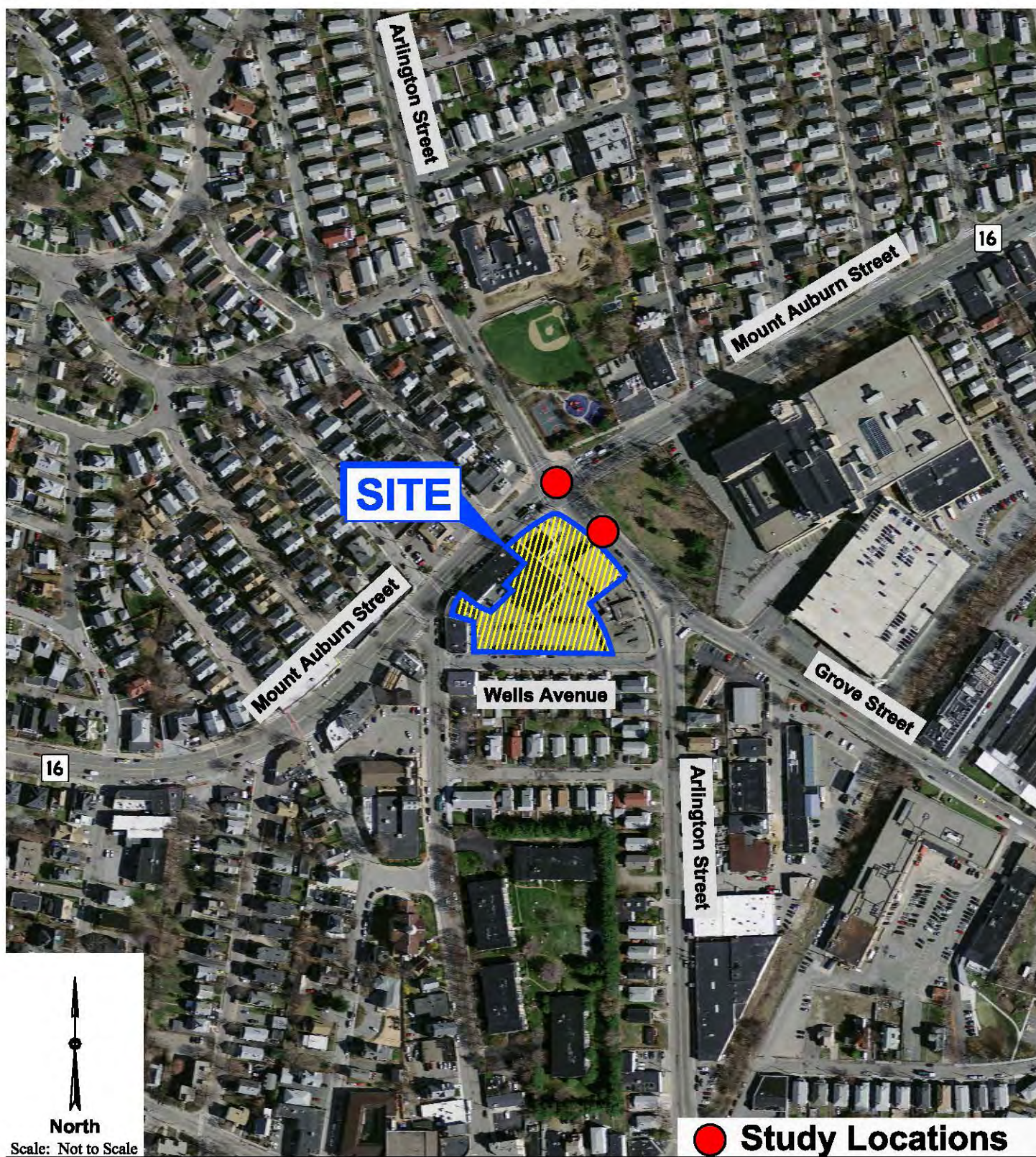


Figure 1

Site Location

Under the proposed site program, three existing buildings on-site (automobile service center, office building, and Elks Club) will be removed and the Site will re-developed to include a 14,000± sf CVS pharmacy with a 83± space off-street parking lot (40± spaces provided for the Pharmacy). The existing 2,982± sf Citizen Bank building will remain unchanged. The existing site driveway along Mount Auburn Street (existing gas station driveway) and the two driveways on Arlington Street closest to Mount Auburn Street (existing gas station driveways) will all be removed. The Elks driveway along Arlington Street will be re-constructed to allow for full access from Arlington Street but will be restricted to right out egress movements. Likewise, the eastern driveway along Wells Avenue will be removed while the western driveway closest to Bigelow Avenue will be retained as a right-in/ right-out driveway to Wells Avenue. A preliminary site plan prepared by Bohler Engineering is presented in **Figure 2**.

## **EXISTING TRAFFIC & SAFETY CHARACTERISTICS**

An overview of existing roadway conditions, traffic volumes and safety characteristics is provided below.

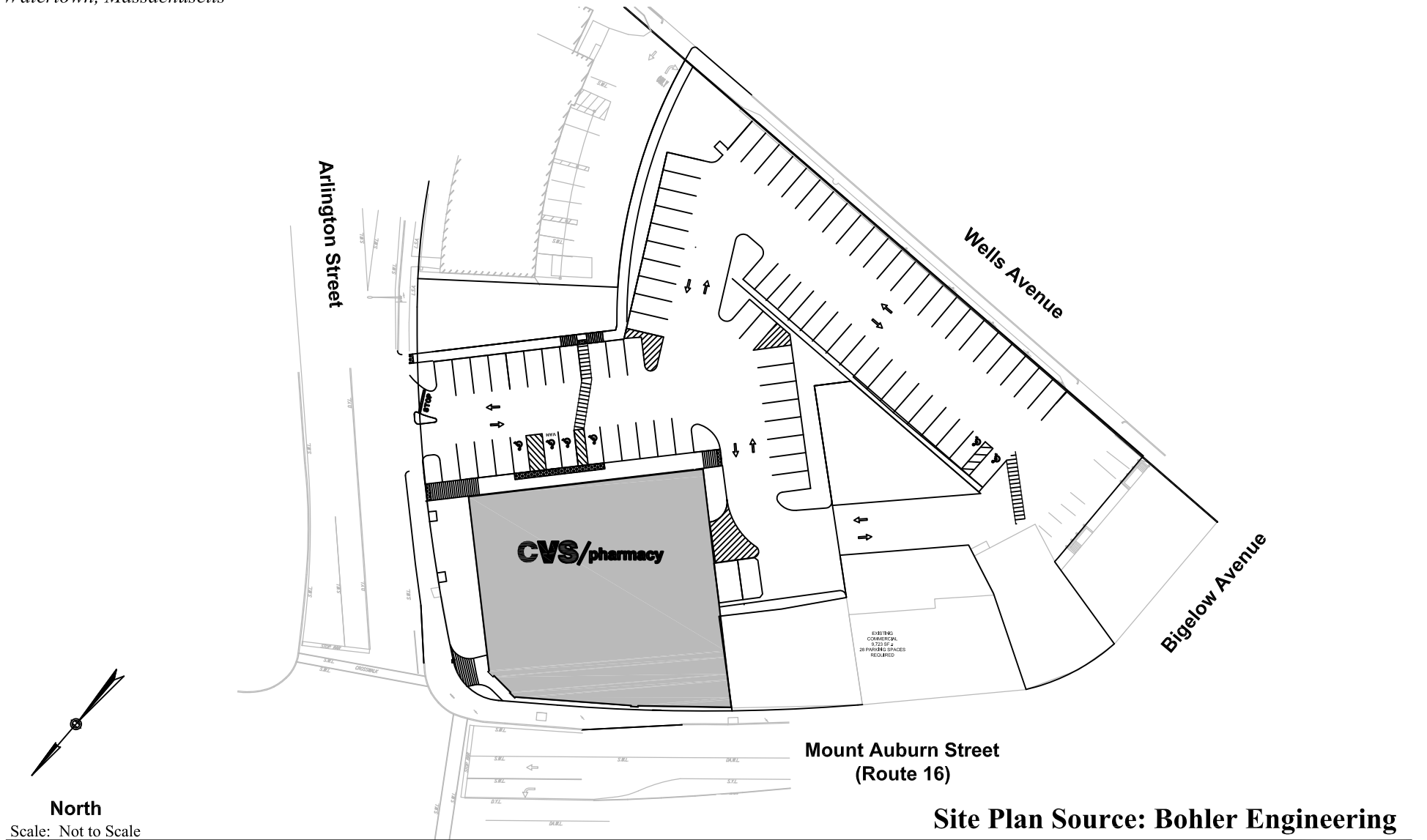
### **Roadway**

#### **Mount Auburn Street**

Mount Auburn Street (Route 16) is classified by the Massachusetts Department of Transportation (MassDOT) as a Principal Arterial roadway under local (Town) jurisdiction within the study area. Mount Auburn Street is generally an east-west roadway providing two travel lanes in each direction with additional turn lanes at major intersections within the study area. Mount Auburn Street provides a connection between Route 20 and the City line with Cambridge. Sidewalks are provided along both sides of the roadway and crosswalks are provided at major intersections within the study area. Land use along Mount Auburn Street in the site vicinity is primarily commercial and includes a Mobil gas station, 7-Eleven, Tufts Health Plan offices and several restaurants.

#### **Arlington Street**

Arlington Street is classified by MassDOT as an Urban Minor Arterial roadway under local (Town) jurisdiction within the study area. Arlington Street is generally north-south roadway that generally provides one travel lane in each direction with additional lanes at major intersections. Sidewalks are provided along both sides of the roadway and crosswalks are provided at major intersections within the study area. Land use along Arlington Street in the site vicinity generally consists of commercial, residential, recreational and community uses including Coolidge Playground and an Elks Club (Site).



## **Baseline Traffic Data**

Traffic volume data was collected at the Mount Auburn Street/Arlington Street study intersection and at the existing site driveways along Mount Auburn Street and Arlington Street during the weekday morning (7:00 AM - 9:00 AM), weekday evening (4:00 PM – 6:00 PM), and Saturday midday (11:00 AM – 1:00 PM) periods to coincide with peak traffic activity of the proposed use and the adjacent streets. Traffic data used in this evaluation was collected in November 2013. These data reflect average traffic conditions based on review of MassDOT permanent count station data for the area. Therefore, no seasonal adjustment to the November 2013 observed traffic volumes was applied. Traffic count data and MassDOT permanent count station data are provided in the **Attachments**. The baseline weekday morning, weekday evening, and Saturday midday peak hour traffic volumes for the study intersections are shown in **Figure 3**, **Figure 4** and **Figure 5**.

### *Existing Trip Generation – Premier Petrol*

Observed trip generation for the existing Premier Petrol use at the site has been determined based on turning movement counts conducted at the site driveways in November 2013. **Table 1** presents Premier Petrol's existing trip generation characteristics during the study periods.

**TABLE 1**  
**EXISTING TRIP GENERATION – PREMIER PETROL**

<b>Period/Direction</b>	<b>Site Trips<sup>1</sup></b>
<i>Weekday Morning Peak Hour</i>	
Entering	9
<u>Exiting</u>	<u>5</u>
Total	14
<i>Weekday Evening Peak Hour</i>	
Entering	10
<u>Exiting</u>	<u>9</u>
Total	19
<i>Saturday Midday Peak Hour</i>	
Entering	21
<u>Exiting</u>	<u>10</u>
Total	31

<sup>1</sup>Based on turning movement counts conducted at the existing site driveways on November 16, 2013 and November 19, 2013.

As summarized in **Table 1**, the existing use at the site (Premier Petrol) currently generates approximately 14 vehicle trips (9 entering and 5 exiting) during the weekday morning peak hour, 19 vehicle trips (10 entering and 9 exiting) during the weekday evening peak hour and 31 vehicle trips (21 entering and 10 exiting) during the Saturday midday peak hour of the site.

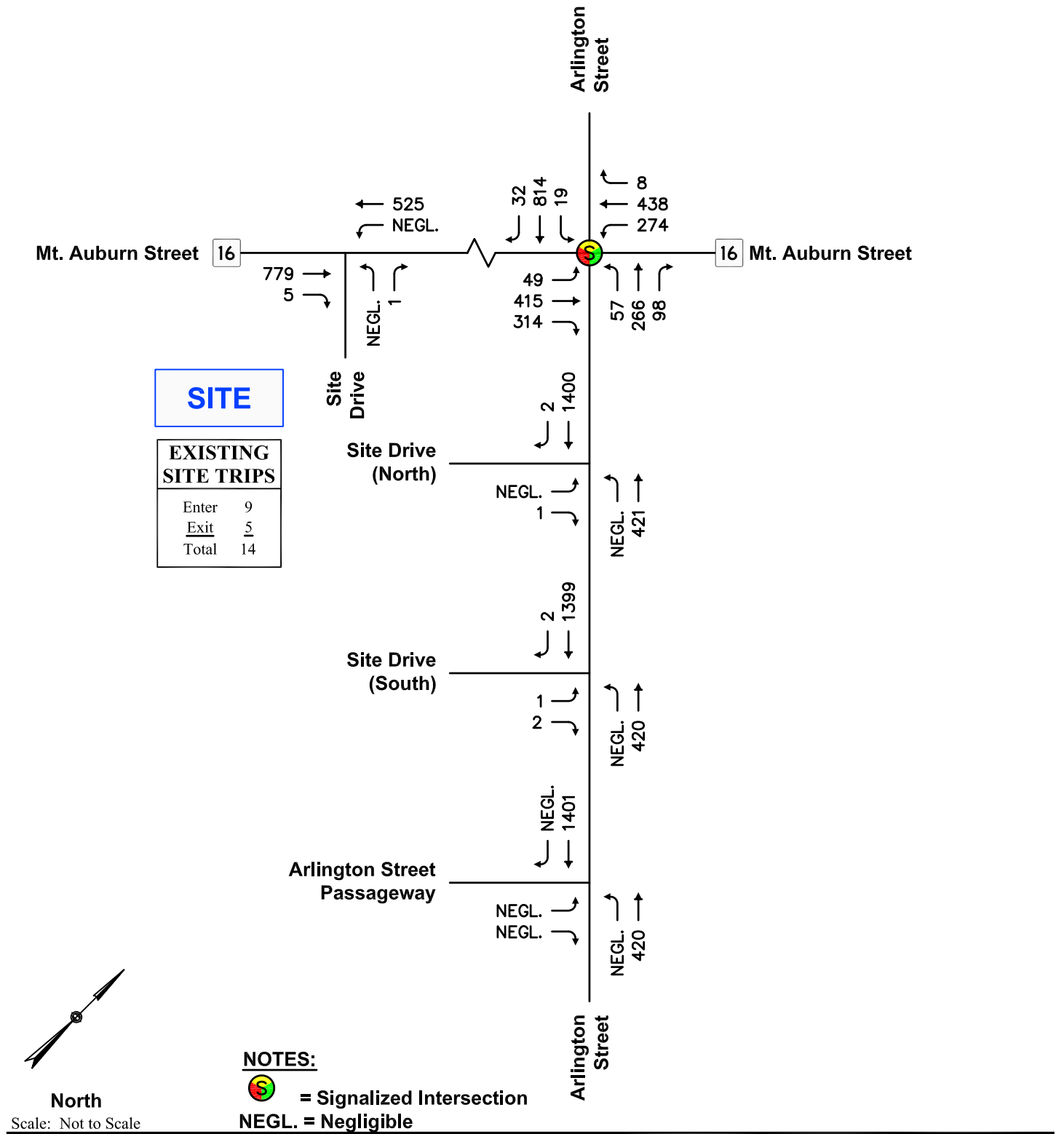


Figure 3

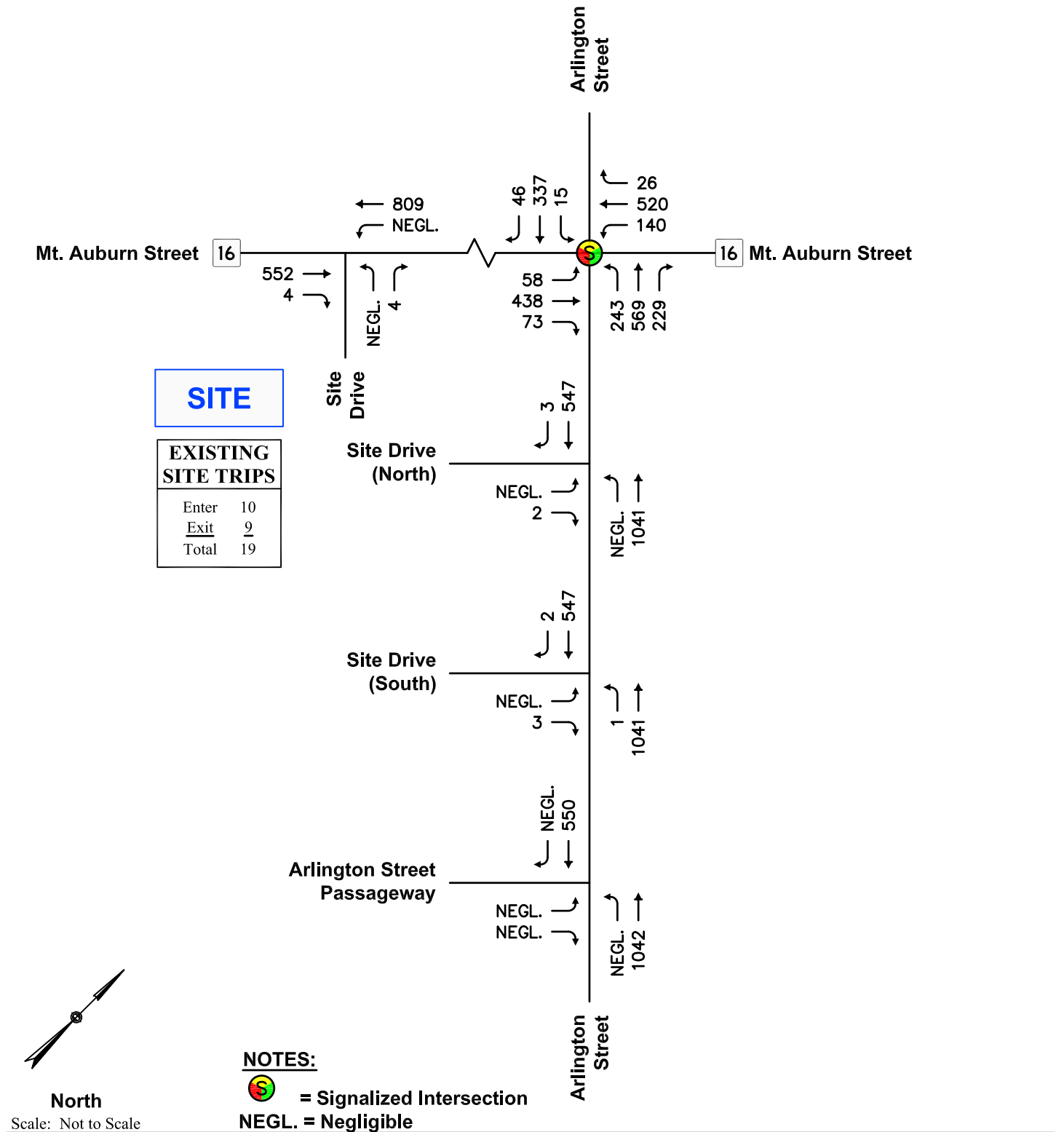


Figure 4

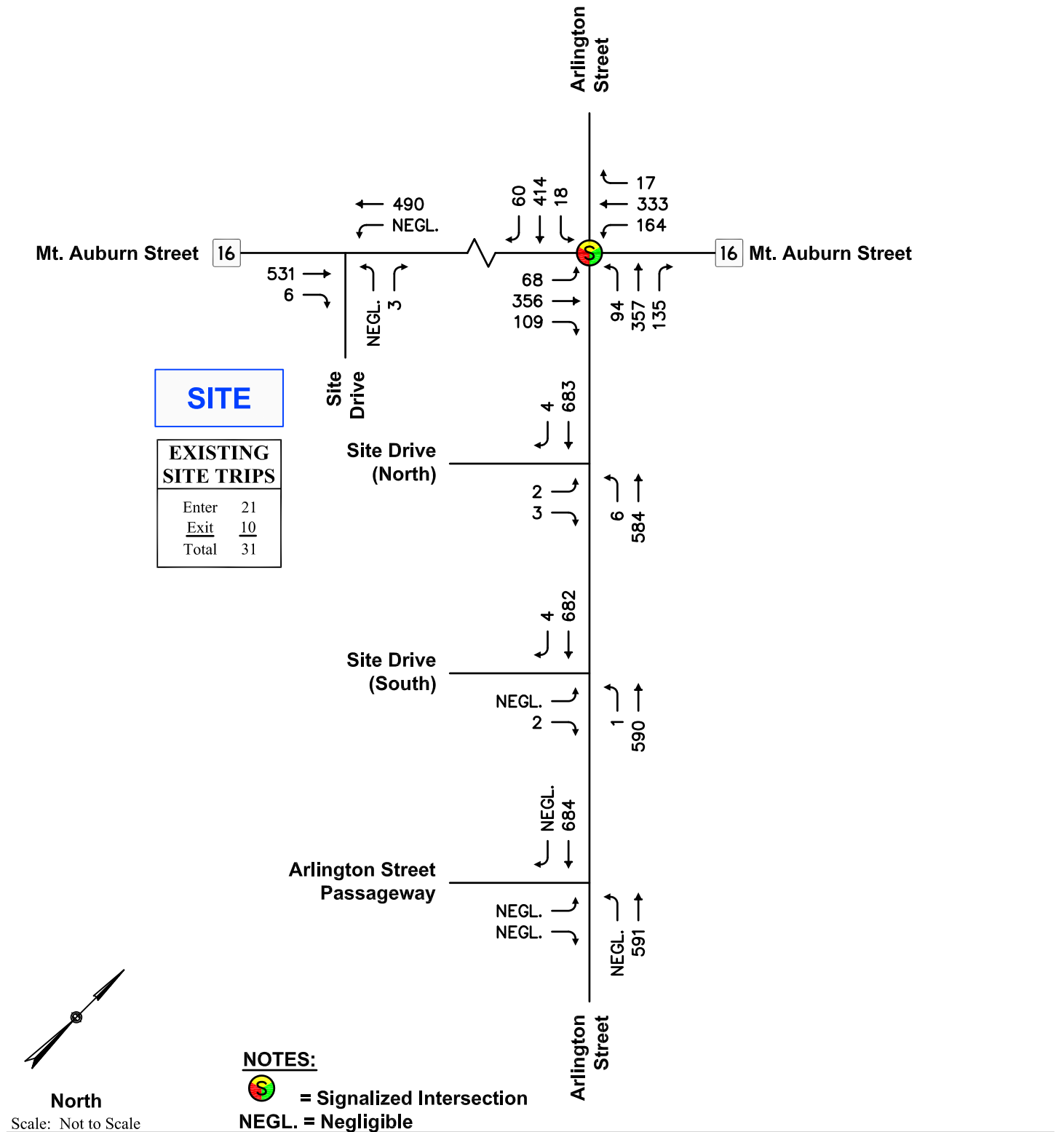


Figure 5

## Intersection Crash History

In order to identify crash trends and safety characteristics for study area intersections, crash data were obtained from MassDOT for the Town of Watertown for the three-year period 2009 through 2011 (the most recent data currently available from MassDOT). Crash data for the study intersections is summarized in **Table 2** with detailed data provided in the **Attachments**.

Crash rates were calculated for the study area intersections as reported in **Table 2**. This rate quantifies the number of crashes per million entering vehicles. MassDOT has determined the official District 6 (which includes the Town of Watertown) crash rate to be 0.58 for unsignalized intersections and 0.76 for signalized intersections. This rate represents MassDOT's "average" crash experience for District 6 communities and serves as a basis for comparing reported crash rates for the study intersections. Where calculated crash rates notably exceed the district average, some form of safety countermeasures may be warranted. Crash rate calculations are provided in the **Attachments**.

As summarized in **Table 2**:

- There are a total of twelve (12) crashes reported at the Mount Auburn Street (Route 16)/Arlington Street signalized intersection during the three-year study period. The resulting crash rate is 0.37 which is well below the District 6 average of 0.76 for signalized intersections. The majority of crashes involved single vehicle crashes (33%) followed by angle-type (25%), and rear-end (25%) type collisions. The majority (75%) resulted in property damage type crashes under dry roadway conditions (83%). All but one (1) of the reported crashes occurred outside of the weekday morning and evening peak commuter periods.
- There were no reported crashes at the site driveways during the three-year study period.

In summary, the study intersections all experienced crash rates well below the District 6 averages and no immediate safety countermeasures are warranted based on the crash history at the study intersections.

**TABLE 2**  
**INTERSECTION CRASH SUMMARY**  
**2009 THROUGH 2011<sup>1</sup>**

Data Category	INTERSECTION
	Mt Auburn Street (Route 16) at Arlington Street
Traffic Control	Signalized
Crash Rate <sup>2</sup>	<b>0.37</b>
District 6 Avg <sup>3</sup>	0.76
<i>Year:</i>	
2009	5
2010	4
<u>2011</u>	<u>3</u>
Total	<b>12</b>
<i>Type:</i>	
Angle	3
Rear-End	3
Head-On	1
Sideswipe	1
Single Vehicle	4
Other/Unknown	0
<i>Severity:</i>	
P. Damage Only	9
Personal Injury	3
Fatality	0
Unknown	0
<i>Conditions:</i>	
Dry	10
Wet	2
Snow	0
Other/Unknown	0
<i>Time:</i>	
7:00 to 9:00 AM	0
4:00 to 6:00 PM	1
Rest of Day	11

<sup>1</sup> Source: MassDOT Crash Database

<sup>2</sup> Crashes per million entering vehicles

<sup>3</sup> District 6 averages = 0.76 (signalized) and 0.58 (unsignalized)

## PROJECTED TRIP GENERATION

The trip generation estimates for the proposed pharmacy development are provided for the weekday morning, weekday evening and Saturday midday periods, which correspond to the critical analysis periods for the proposed use and adjacent street traffic flow. Under the proposed development program, the existing Premier Petrol gas station, vacant office building, and Elks Club building will be removed and a 14,000± sf pharmacy building will be constructed. The existing Citizen Bank building will remain unchanged.

### *Trip Generation Methodology*

New traffic generated by the pharmacy development was estimated using trip rates published in ITE's *Trip Generation*<sup>1</sup> for the Land Use Code (LUC) 880 (Pharmacy/Drugstore without Drive-Through Window). Trip rates for ITE LUC 880 were applied to the proposed 14,000± sf pharmacy building.

The trip estimates were then adjusted to reflect pass-by traffic, which represents the portion of site-generated trips that is drawn from the existing traffic stream and that is not "new" traffic to area roadways. A pass-by rate of 53% was applied per ITE guidance for the pharmacy (without drive-through window) land use category. Trip generation calculations are provided in the **Attachments**.

As a conservative measure, no credit or reduction is taken for trips that may be shared between the adjacent commercial land uses. Furthermore, no reduction in trips was taken for pedestrian-related trips, despite the likelihood that walking trips will represent a significant portion of business for the site from the neighborhood and/or local businesses. The trip generation for the Site is presented below in **Table 3**.

---

<sup>1</sup> *Trip Generation*, Ninth Edition; Institute of Transportation Engineers; Washington, DC; 2012.

**TABLE 3**  
**TRIP-GENERATION SUMMARY**

Period/Direction	Site Trips <sup>1</sup>		
	Total	Pass-By	Net New
<i>Weekday Morning Peak Hour</i>			
Entering	27	-11	16
<u>Exiting</u>	<u>14</u>	<u>-11</u>	<u>3</u>
Total	41	-22	19
<i>Weekday Evening Peak Hour</i>			
Entering	58	-31	27
<u>Exiting</u>	<u>60</u>	<u>-31</u>	<u>29</u>
Total	118	-62	56
<i>Saturday Midday Peak Hour</i>			
Entering	74	-40	34
<u>Exiting</u>	<u>76</u>	<u>-40</u>	<u>36</u>
Total	150	-80	70
<i>Weekday Daily</i>	1,260	-668	592
<i>Saturday Daily</i>	1,604	-850	754

Source: ITE *Trip Generation*, Ninth Edition; 2012.

<sup>1</sup>Based on ITE LUC 880 applied to 14,000 sf; adjusted to reflect 53% pass-by trips per ITE guidance.

As summarized in **Table 3**, the proposed pharmacy development is estimated to generate approximately 19 new vehicle trips (16 entering and 3 exiting) during the weekday morning peak hour, 56 new vehicle trips (27 entering and 29 exiting) during the weekday evening peak hour and 70 new vehicle trips (34 entering and 36 exiting) during the Saturday midday peak hour. On a daily basis, the proposed development is estimated to generate approximately 592 new vehicle trips on a weekday and 754 new vehicle trips on a Saturday with 50 percent entering and exiting.

#### *Comparison to Existing Site Uses*

**Table 4** presents a summary of the net peak hour trip increases for the site based on the anticipated use of the Site by a CVS pharmacy compared to the operational characteristics of the existing Site uses (Premier Petrol, office space, and Elks Lodge). The Premier Petrol use was based on observations at the Site driveways, the office space was estimated base on ITE Trip Generation guidelines based on historical employment levels, and field observations indicated that the Elks Club generated negligible trips during the peak study periods during normal operations as a Fraternal Club.

**TABLE 4**  
**TRIP-GENERATION COMPARISON**

	Net Site Trips				
Period/Direction	Pharmacy (Proposed) <sup>1</sup>	Gas Station (Existing) <sup>2</sup>	Office (Existing) <sup>3</sup>	Elks (Existing) <sup>4</sup>	Net Difference
<i>Weekday Morning Peak Hour</i>					
Entering	16	5	5	Negl.	+6
<u>Exiting</u>	<u>3</u>	<u>3</u>	<u>1</u>	<u>Negl.</u>	<u>-1</u>
Total	19	8	6	Negl.	+5
<i>Weekday Evening Peak Hour</i>					
Entering	27	6	1	Negl.	+20
<u>Exiting</u>	<u>29</u>	<u>5</u>	<u>5</u>	<u>Negl.</u>	<u>+19</u>
Total	56	11	6	Negl.	+39
<i>Saturday Midday Peak Hour</i>					
Entering	34	12	1	Negl.	+21
<u>Exiting</u>	<u>36</u>	<u>6</u>	<u>0</u>	<u>Negl.</u>	<u>+30</u>
Total	70	18	1	Negl.	+51

<sup>1</sup> Net New Trips after applying pass-by factor of 53% - see Table 3

<sup>2</sup> Observed trip activity as reported in Table 1 reduced by 42 percent to reflect pass-by trips per ITE Land Use Code 944 (Gasoline/Service Station) .

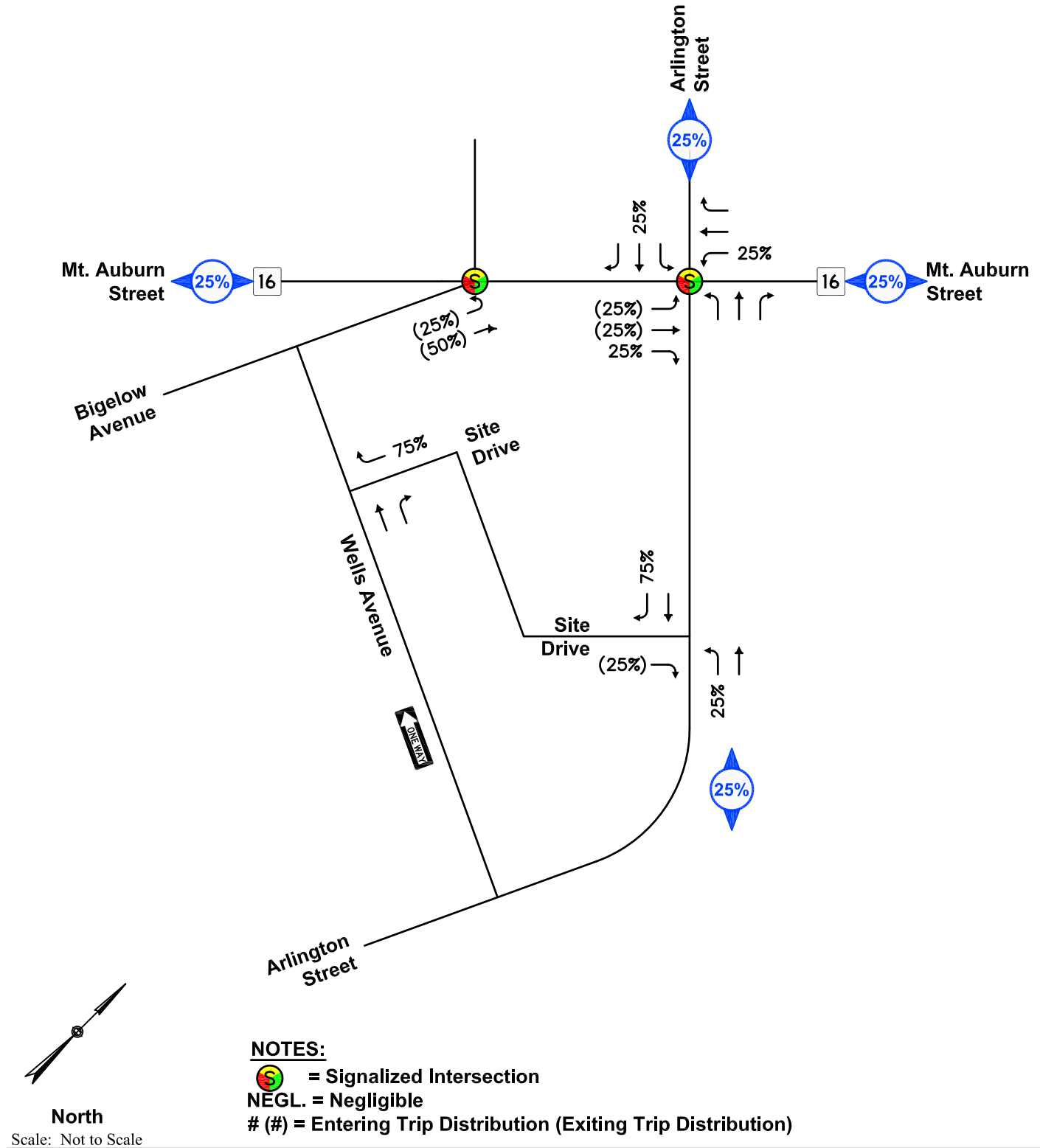
<sup>3</sup>Based on ITE LUC 710 (General Office) applied to 12 employees; estimated employment level of the most recent building tenant.

<sup>4</sup>Negl. = Negligible; no trip credit was taken for the Elks use under normal operating conditions.

As summarized in **Table 4**, relative to the existing uses at the site (Premier Petrol, vacant office space, and Elks Lodge), the proposed Pharmacy is expected to result in a small net estimated increase of only 5 vehicle-trips during the weekday morning peak hour, a 39 vehicle-trip increase during the weekday evening peak hour and a 51 vehicle-trip increase on a Saturday Midday peak hour. This represents approximately one to two additional vehicles every two minutes at the site driveways – a level of traffic increase that is immaterial and will not measurably impact area traffic flow or traffic operations.

### **Trip Distribution**

The distribution for projected traffic for the proposed pharmacy development is based primarily on existing travel patterns and volumes of the adjacent roadway system. The resulting trip distribution for new trips is presented in **Figure 6** for the weekday morning, weekday evening and Saturday midday peak hours. Trip distribution calculations are provided in the **Attachments**.



Development-related trips for the proposed pharmacy are assigned to the roadway network using the ITE trip-generation estimates shown in **Table 3** and the distribution patterns presented in **Figures 6**. Development-related trips at each intersection approach for the weekday morning, weekday evening and Saturday midday peak hours are quantified in **Figure 7**, **Figure 8** and **Figure 9**, respectively.

In summary, approximately 25% of trips will be oriented along Mount Auburn Street either east or west of the Site, and 25% along Arlington Street either north or south of the site. As with existing observed site trip patterns, virtually all of these trips will be right-turns into or exiting the site, except for a small number of left-turns into the property from Arlington Street. Relative trip increases for the pharmacy use therefore represent fewer than 20 new vehicles per hour on Mt. Auburn Street or Arlington Street, and in the case of Wells Avenue represents up to 46 vehicles per hour (less than one vehicle per minute that are destined to Mount Auburn Street or Arlington Street to the north of Mount Auburn Street).

### **Design Year Traffic Conditions**

Design Year condition traffic volumes are derived by adding the incremental traffic increases for a pharmacy use at the site to the Existing (Baseline) conditions. As part of the proposed development plan, the existing gas station use at the site will be eliminated. Therefore, in order to obtain the future Design Year traffic volumes, the trips associated with the existing use at the site were removed from the roadway network and the trips associated with the proposed pharmacy use (as presented in **Table 3**) were added to the Existing (Baseline) traffic volumes. **Figure 10**, **Figure 11** and **Figure 12** present the Design Year condition traffic-volume networks for the weekday morning, weekday evening and Saturday midday peak hours, respectively. Trip tracings for removal of the existing site trips are presented in the **Attachments**.

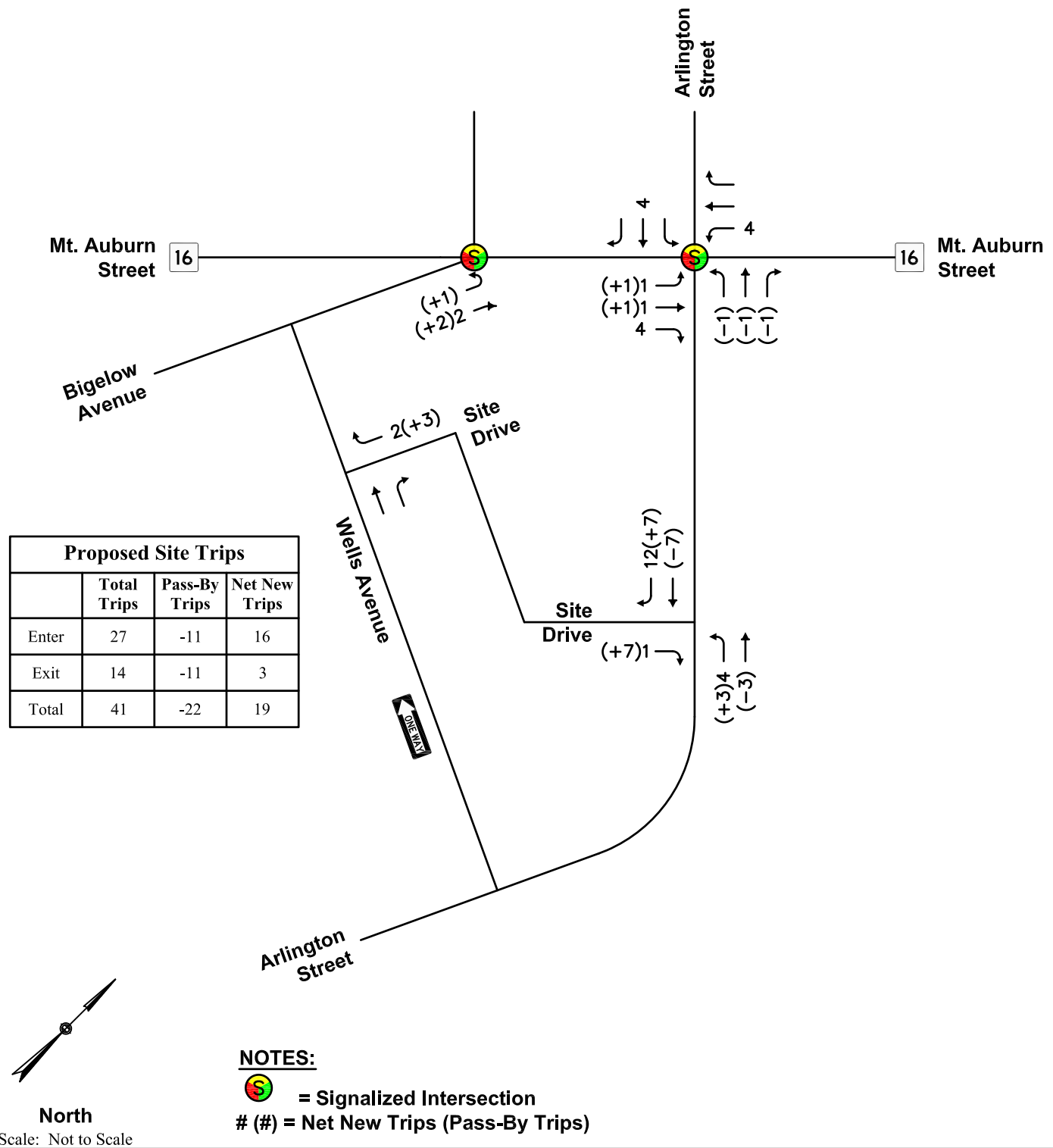


Figure 7

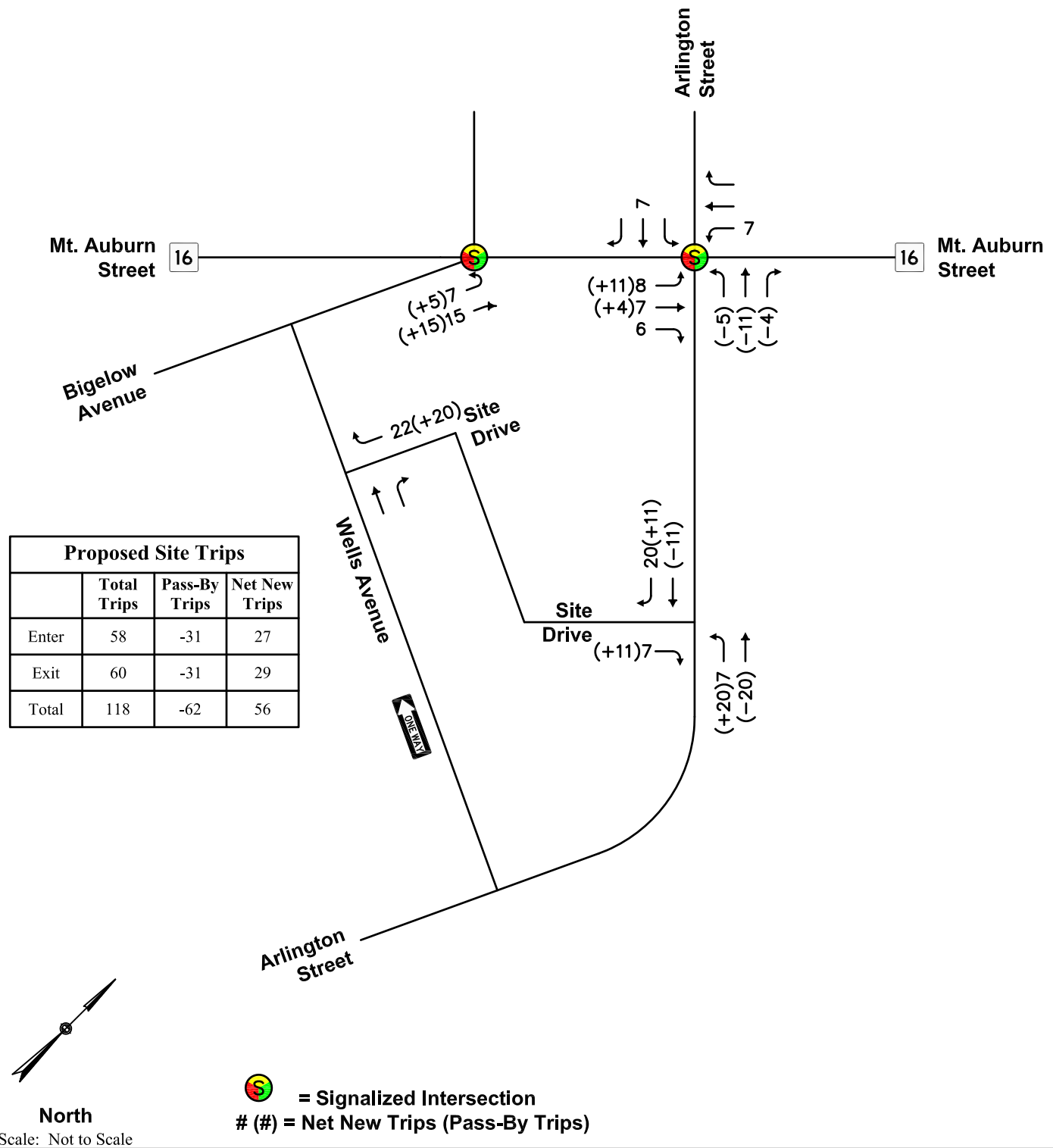


Figure 8

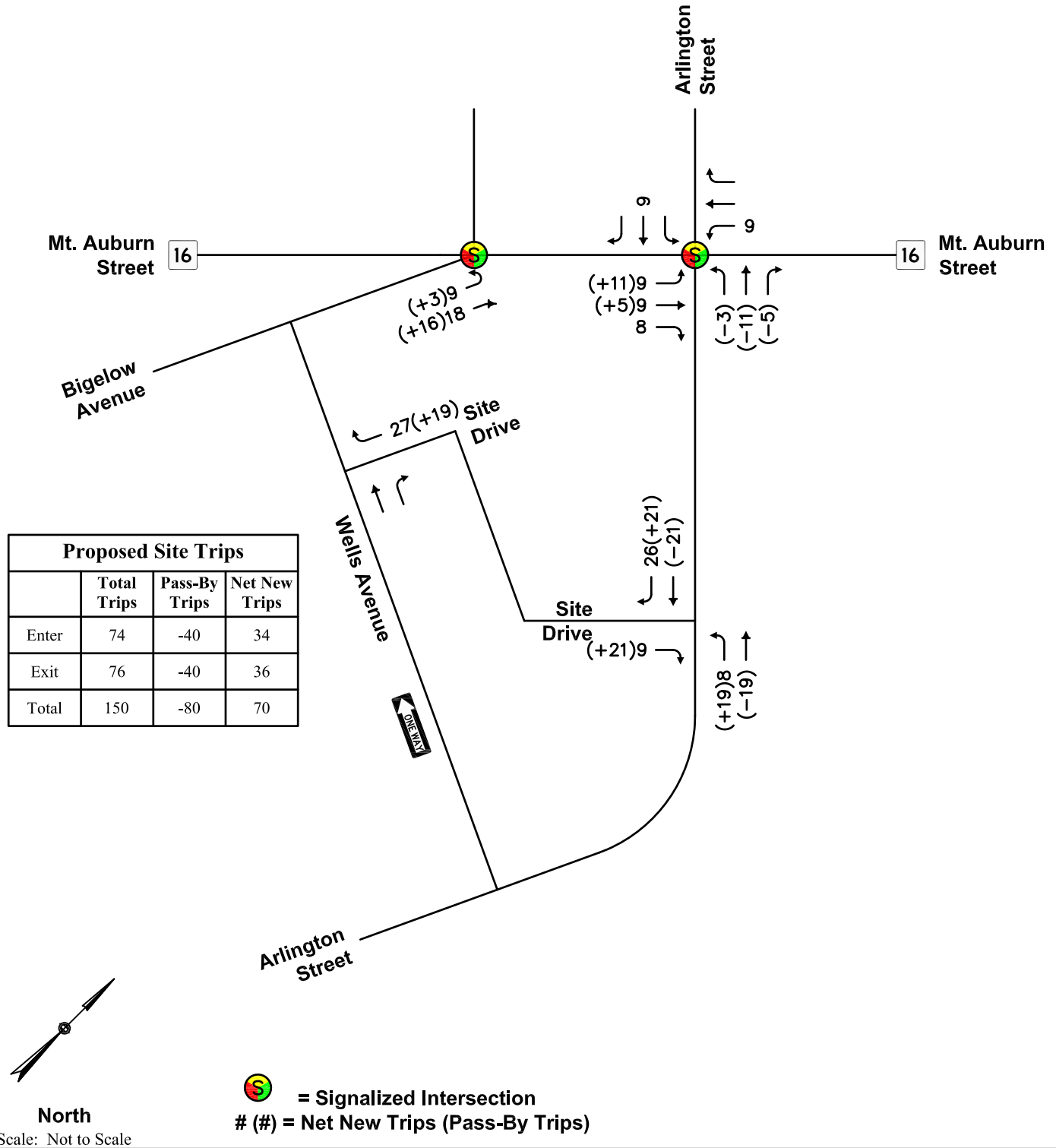


Figure 9

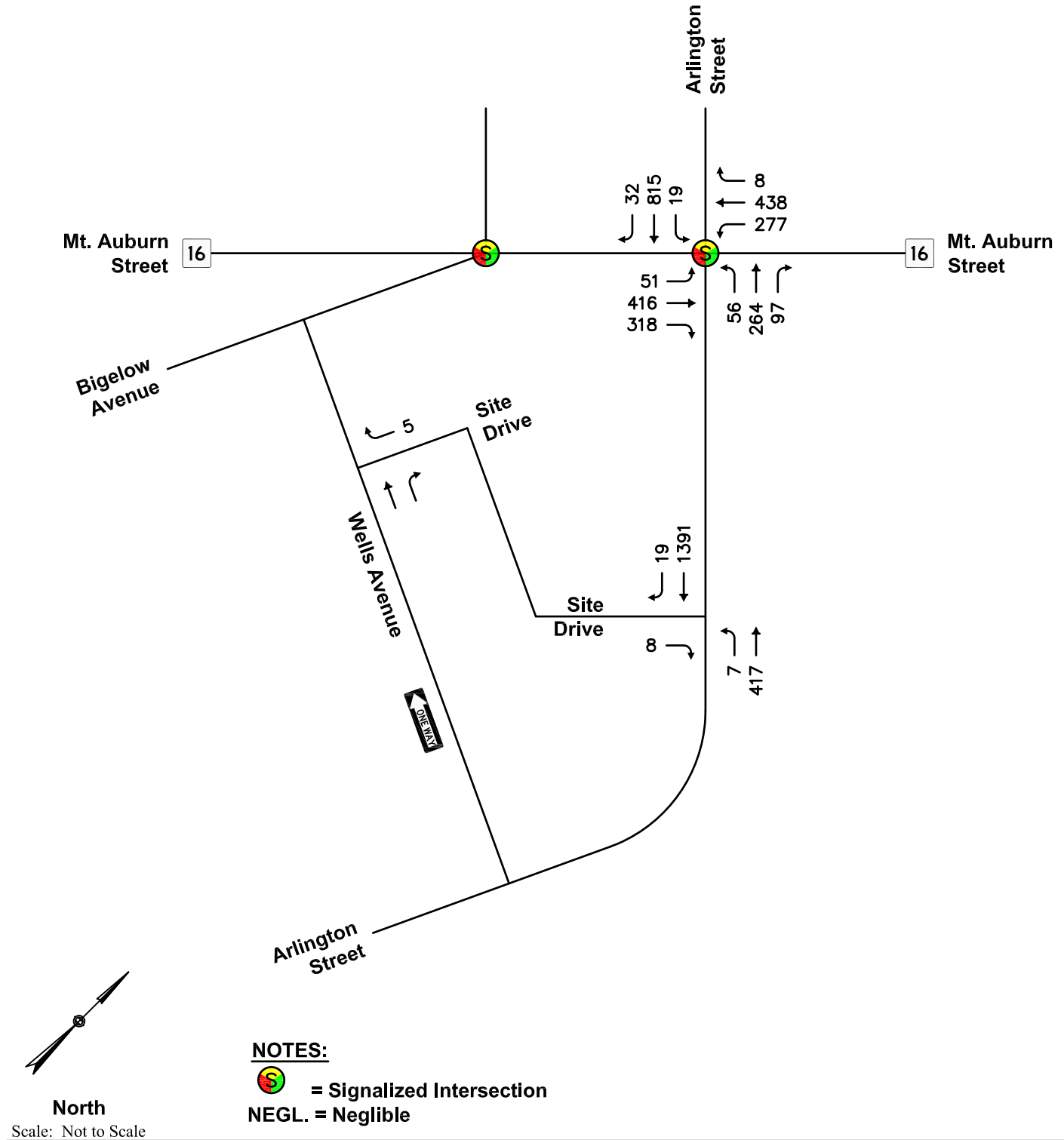


Figure 10

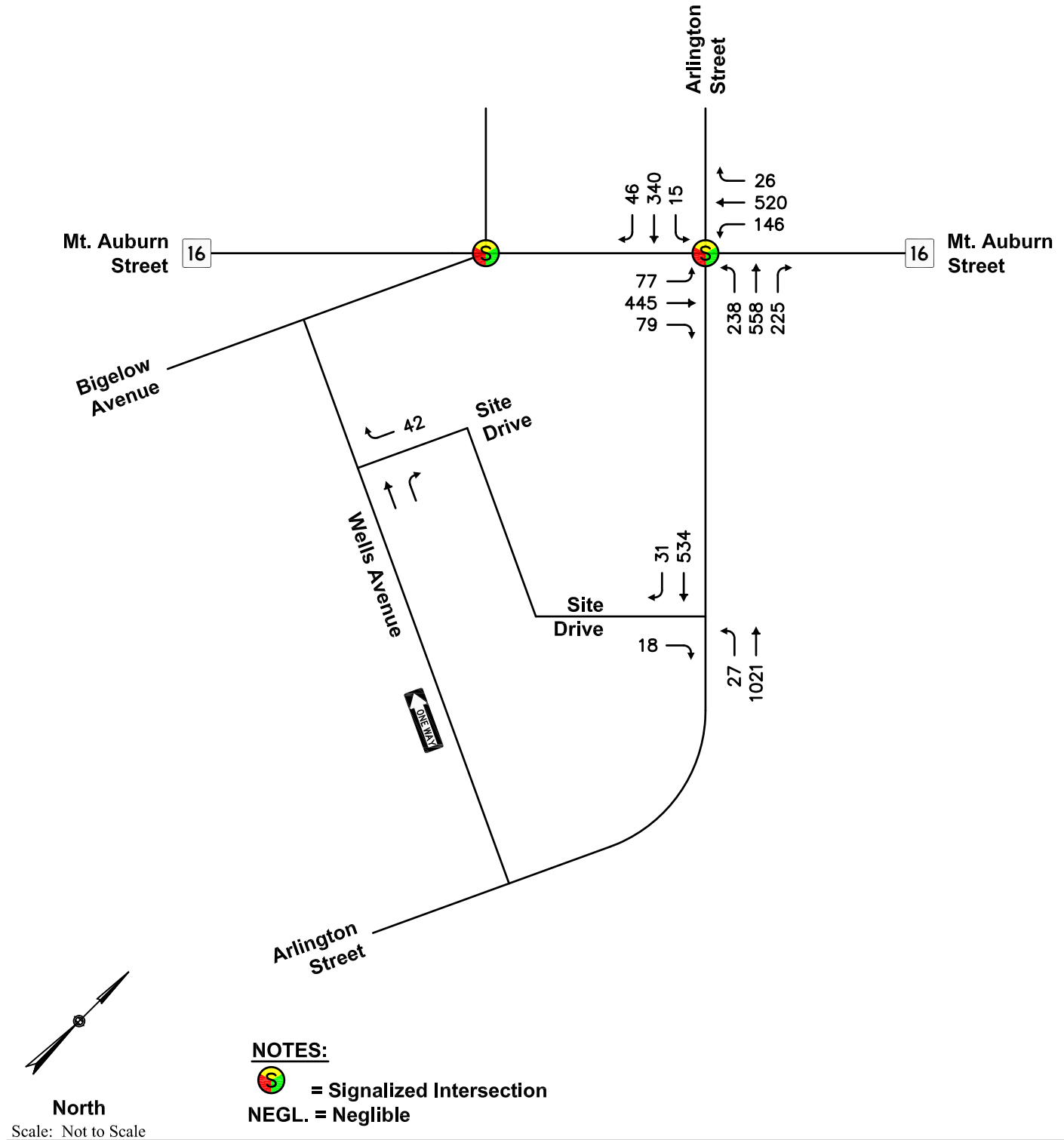


Figure 11

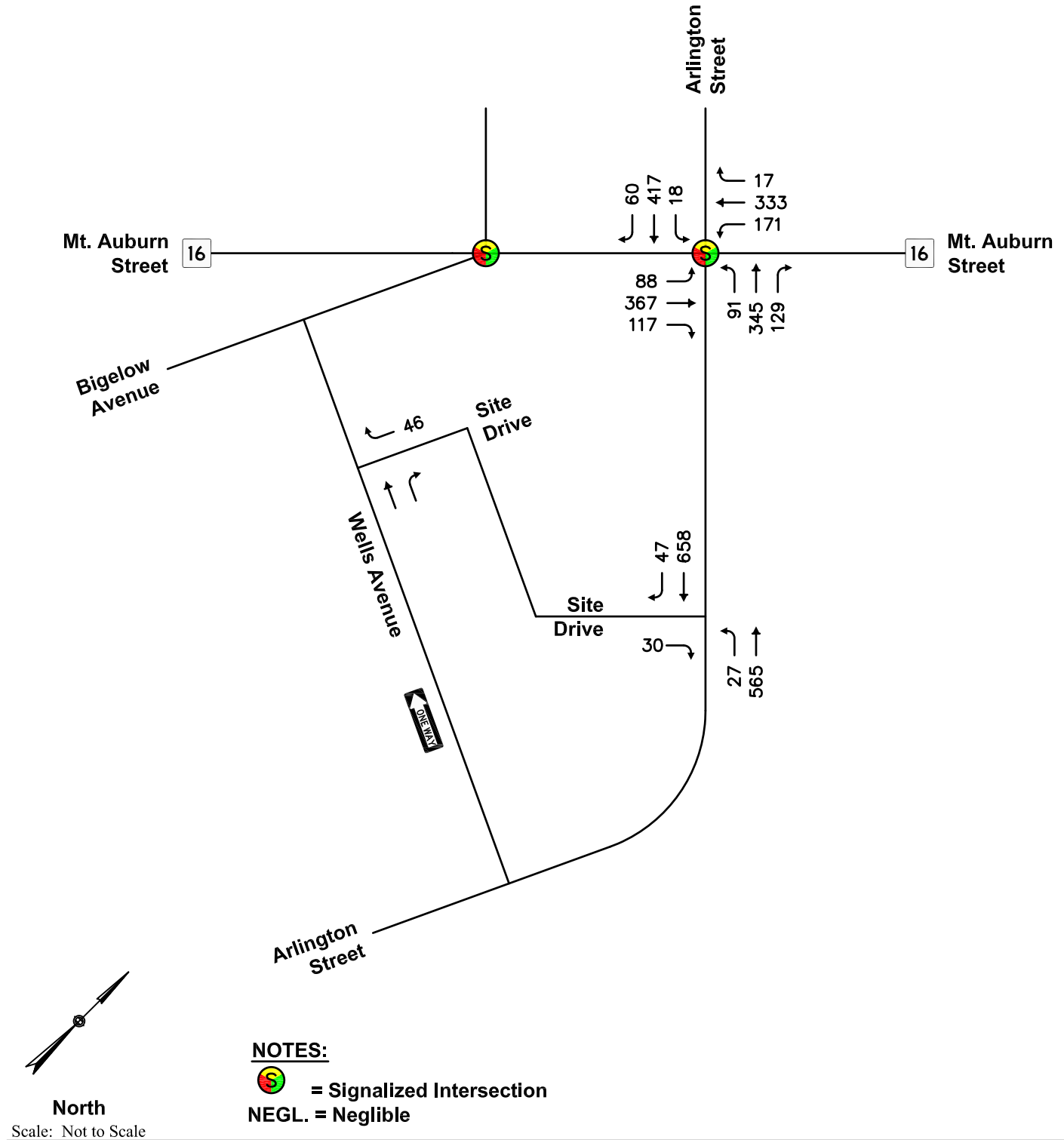


Figure 12

## SIGNALIZED INTERSECTION OPERATIONS ANALYSIS

This section provides an overview of operational analysis methodology and an assessment of the Mount Auburn Street/Arlington Street signalized operations under Existing (Baseline) and projected future Design Year Conditions.

### Analysis Methodology

Intersection capacity analyses are presented in this section for the Existing and Design Year traffic-volume conditions for the Mount Auburn Street/Arlington Street signalized intersection. Capacity analyses, conducted in accordance with EEA/MassDOT guidelines, provide an index of how well the roadway facilities serve the traffic demands placed upon them. The operational results provide the basis for recommended access and roadway improvements in the following section.

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 80 seconds for signalized movements). The specific control delays and associated LOS designations are presented in the **Attachments**.

### Analysis Results

Level-of-Service (LOS) analyses were conducted for the Existing (Baseline) and Design Year conditions for the study intersections. The results of the intersection capacity are summarized below in **Table 5**. Detailed analysis results are presented in the **Attachments**.

**TABLE 5**  
**INTERSECTION CAPACITY ANALYSIS RESULTS**  
**MOUNT AUBURN STREET/ARLINGTON STREET**

Period/Approach	Existing (Baseline)			Design Year		
	v/c <sup>1</sup>	Delay <sup>2</sup>	LOS <sup>3</sup>	v/c	Delay	LOS
<i>Weekday Morning Peak Hour</i>						
Eastbound	1.00	72	E	1.02	75	E
Westbound	0.69	26	C	0.69	26	C
Northbound	0.71	39	D	0.70	38	D
<u>Southbound</u>	<u>0.89</u>	<u>47</u>	<u>D</u>	<u>0.89</u>	<u>47</u>	<u>D</u>
Overall	1.00	47	D	1.00	48	D
<i>Weekday Evening Peak Hour</i>						
Eastbound	0.45	29	C	0.46	29	C
Westbound	0.40	18	B	0.42	18	B
Northbound	>1.0	>80	F	>1.0	>80	F
<u>Southbound</u>	<u>0.46</u>	<u>30</u>	<u>C</u>	<u>0.47</u>	<u>30</u>	<u>C</u>
Overall	>1.0	>80	F	>1.0	>80	F
<i>Saturday Midday Peak Hour</i>						
Eastbound	0.44	33	C	0.45	33	C
Westbound	0.44	22	C	0.46	22	C
Northbound	0.80	41	D	0.80	41	D
<u>Southbound</u>	<u>0.52</u>	<u>31</u>	<u>C</u>	<u>0.53</u>	<u>31</u>	<u>C</u>
Overall	0.80	32	C	0.80	32	C

<sup>1</sup>Volume-to-capacity ratio

<sup>2</sup>Average control delay per vehicle (in seconds)

<sup>3</sup>Level of service

As summarized in **Table 5**, the signalized Mount Auburn Street/Arlington Street intersection generally operates below capacity at LOS D or better (overall) operations during the weekday morning and Saturday midday peak hours under Existing (Baseline) conditions. Longer delays (LOS F) are experienced during the weekday evening peak hours. The proposed redevelopment of the site into a pharmacy is expected to have negligible impact on signalized intersection operations with no change in level of service anticipated.

### **Signal Queue Impacts**

The estimated average and 95<sup>th</sup> percentile vehicle queue lengths for the traffic signal at Mount Auburn Street (Route 16)/Arlington Street are presented in **Table 6**. The estimated queue lengths are based on the capacity analysis results provided using Synchro computer software.

**TABLE 6**  
**VEHICLE QUEUE ANALYSIS SUMMARY**  
**MOUNT AUBURN STREET/ARLINGTON STREET**

Period/Approach	Available Queue Storage Length (feet)	Existing (Baseline)		Design Year	
		Average Queue Length <sup>1</sup>	Maximum Queue Length <sup>1</sup>	Average Queue Length <sup>1</sup>	Maximum Queue Length <sup>1</sup>
<i>Weekday Morning Peak Hour</i>					
Eastbound L	75±	<25	63	26	67
Eastbound T/R	300±	233	417	236	420
Westbound L	200±	87	365	88	370
Westbound T/R	>1000	71	163	71	163
Northbound L/T/R	300±/>1000 <sup>2</sup>	129	188	127	186
Southbound L/T/R	150±/>1000 <sup>3</sup>	286	402	287	403
<i>Weekday Evening Peak Hour</i>					
Eastbound L	75±	26	75	35	96
Eastbound T/R	300±	131	232	134	237
Westbound L	200±	45	118	47	123
Westbound T/R	>1000	100	203	99	203
Northbound L/T/R	300±/>1000	478	643	467	626
Southbound L/T/R	150±/>1000	109	165	111	167
<i>Saturday Midday Peak Hour</i>					
Eastbound L	75±	31	86	41	109
Eastbound T/R	300±	119	223	125	244
Westbound L	200±	54	142	55	158
Westbound T/R	>1000	60	135	58	135
Northbound L/T/R	300±/>1000	182	256	177	245
Southbound L/T/R	150±/>1000	137	190	140	192

<sup>1</sup>Average and 95<sup>th</sup> percentile queue lengths are reported in feet per lane.

<sup>2</sup>The northbound through/left-turn lane has a storage capacity of approximately 300 ft and the northbound through/right-turn lane has a storage capacity of more than 1,000 ft.

<sup>3</sup>The southbound through/left-turn lane has a storage capacity of approximately 200 ft and the southbound through/right-turn lane has a storage capacity of more than 500 ft.

As summarized in **Table 6**, the calculated average and maximum (95<sup>th</sup> percentile) queues are generally within the available queue storage lengths. Queues along the northbound Arlington Street approach and eastbound Mount Auburn Street approach to the intersection often extend beyond the site driveways during peak hours. Field observations also indicate that queues often extend beyond the site driveways resulting in only occasional left-turn movements exiting the site on to Mount Auburn Street and Arlington Street. The proposed redevelopment of the site is anticipated to remove four driveways and will restricting left turns from the site onto both Arlington Street and Mount Auburn Street; therefore the project will have negligible impact to queues at the Mount Auburn Street/Arlington Street intersection.

## CONCLUSIONS

In summary, MDM finds that the proposed use will generate only a nominal increase in trip activity at the Site that will represent fewer than 20 new vehicles per hour on Mt. Auburn Street or Arlington Street, and in the case of Wells Avenue represents up to 46 vehicles per hour (less than one vehicle per minute that are destined to Mount Auburn Street or Arlington Street to the north of Mount Auburn Street). These additional trips fall within normal day-to-day fluctuations in area traffic and will not materially impact traffic operations. Proposed access improvements will *reduce* potential vehicular conflict points along Mount Auburn Street and Arlington Street relative to existing conditions. Proponent-sponsored improvements will also include repair of pedestrian pushbutton equipment at the adjacent signal at Mt. Auburn Street/Arlington Street that will allow for controlled pedestrian crossings to/from the Site.

## **Attachments**

- Traffic Volume Data
- Seasonal Data
- Crash Data
- Trip Generation Calculations
- Trip Distribution Calculations
- Existing Site Trip Tracings
- Capacity Analysis Worksheets



□ Traffic Volume Data

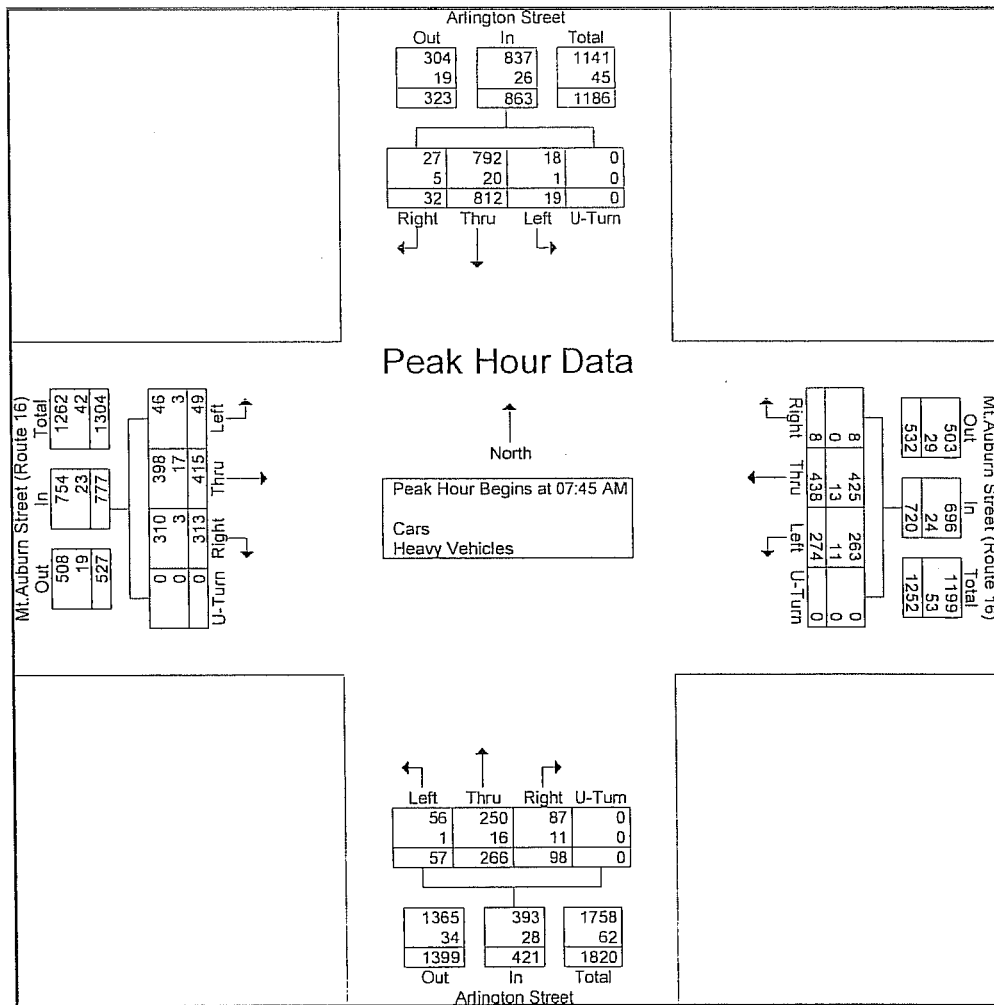


# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 AA  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 2



# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

Location: Arlington Street  
View: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 AA  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Arlington Street From North					Mt.Auburn Street (Route 16) From East					Arlington Street From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
07:00 AM	5	167	6	0	178	0	72	49	0	121	11	42	10	0	63	78	81	14	0	173	535
07:15 AM	7	195	2	0	204	3	97	67	0	167	17	63	16	0	96	60	82	6	0	148	615
07:30 AM	4	212	4	0	220	4	102	61	0	167	11	70	8	0	89	82	107	16	0	205	681
07:45 AM	13	211	1	0	225	1	107	55	0	163	20	68	8	0	96	91	113	17	0	221	705
Total	29	785	13	0	827	8	378	232	0	618	59	243	42	0	344	311	383	53	0	747	2536
08:00 AM	6	204	10	0	220	2	117	65	0	184	22	56	13	0	91	87	97	12	0	196	691
08:15 AM	6	199	3	0	208	2	110	77	0	189	20	75	17	0	112	76	106	11	0	193	702
08:30 AM	7	198	5	0	210	3	104	77	0	184	36	67	19	0	122	59	99	9	0	167	683
08:45 AM	13	180	4	0	197	1	98	64	0	163	27	47	12	0	86	57	106	14	0	177	623
Total	32	781	22	0	835	8	429	283	0	720	105	245	61	0	411	279	408	46	0	733	2699
Grand Total	61	1566	35	0	1662	16	807	515	0	1338	164	488	103	0	755	590	791	99	0	1480	5235
Apprch %	3.7	94.2	2.1	0		1.2	60.3	38.5	0		21.7	64.6	13.6	0		39.9	53.4	6.7	0		
Total %	1.2	29.9	0.7	0	31.7	0.3	15.4	9.8	0	25.6	3.1	9.3	2	0	14.4	11.3	15.1	1.9	0	28.3	
Cars	53	1533	34	0	1620	16	771	488	0	1275	135	459	97	0	691	585	755	90	0	1430	5016
% Cars	86.9	97.9	97.1	0	97.5	100	95.5	94.8	0	95.3	82.3	94.1	94.2	0	91.5	99.2	95.4	90.9	0	96.6	95.8
Heavy Vehicles	8	33	1	0	42	0	36	27	0	63	29	29	6	0	64	5	36	9	0	50	219
% Heavy Vehicles	13.1	2.1	2.9	0	2.5	0	4.5	5.2	0	4.7	17.7	5.9	5.8	0	8.5	0.8	4.6	9.1	0	3.4	4.2

Start Time	Arlington Street From North					Mt.Auburn Street (Route 16) From East					Arlington Street From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	13	211	1	0	225	1	107	55	0	163	20	68	8	0	96	91	113	17	0	221	705
08:00 AM	6	204	10	0	220	2	117	65	0	184	22	56	13	0	91	87	97	12	0	196	691
08:15 AM	6	199	3	0	208	2	110	77	0	189	20	75	17	0	112	76	106	11	0	193	702
08:30 AM	7	198	5	0	210	3	104	77	0	184	36	67	19	0	122	59	99	9	0	167	683
Total Volume	32	812	19	0	863	8	438	274	0	720	98	266	57	0	421	313	415	49	0	777	2781
% App. Total	3.7	94.1	2.2	0		1.1	60.8	38.1	0		23.3	63.2	13.5	0		40.3	53.4	6.3	0		
PHF	.615	.962	.475	.000	.959	.667	.936	.890	.000	.952	.681	.887	.750	.000	.863	.860	.918	.721	.000	.879	.986
Cars	27	792	18	0	837	8	425	263	0	696	87	250	56	0	393	310	398	46	0	754	2680
% Cars	84.4	97.5	94.7	0	97.0	100	97.0	96.0	0	96.7	88.8	94.0	98.2	0	93.3	99.0	95.9	93.9	0	97.0	96.4
Heavy Vehicles	5	20	1	0	26	0	13	11	0	24	11	16	1	0	28	3	17	3	0	23	101
% Heavy Vehicles	15.6	2.5	5.3	0	3.0	0	3.0	4.0	0	3.3	11.2	6.0	1.8	0	6.7	1.0	4.1	6.1	0	3.0	3.6

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Agent: MDM/ C. Jones

File Name : 133646 AA  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Peds and Bikes

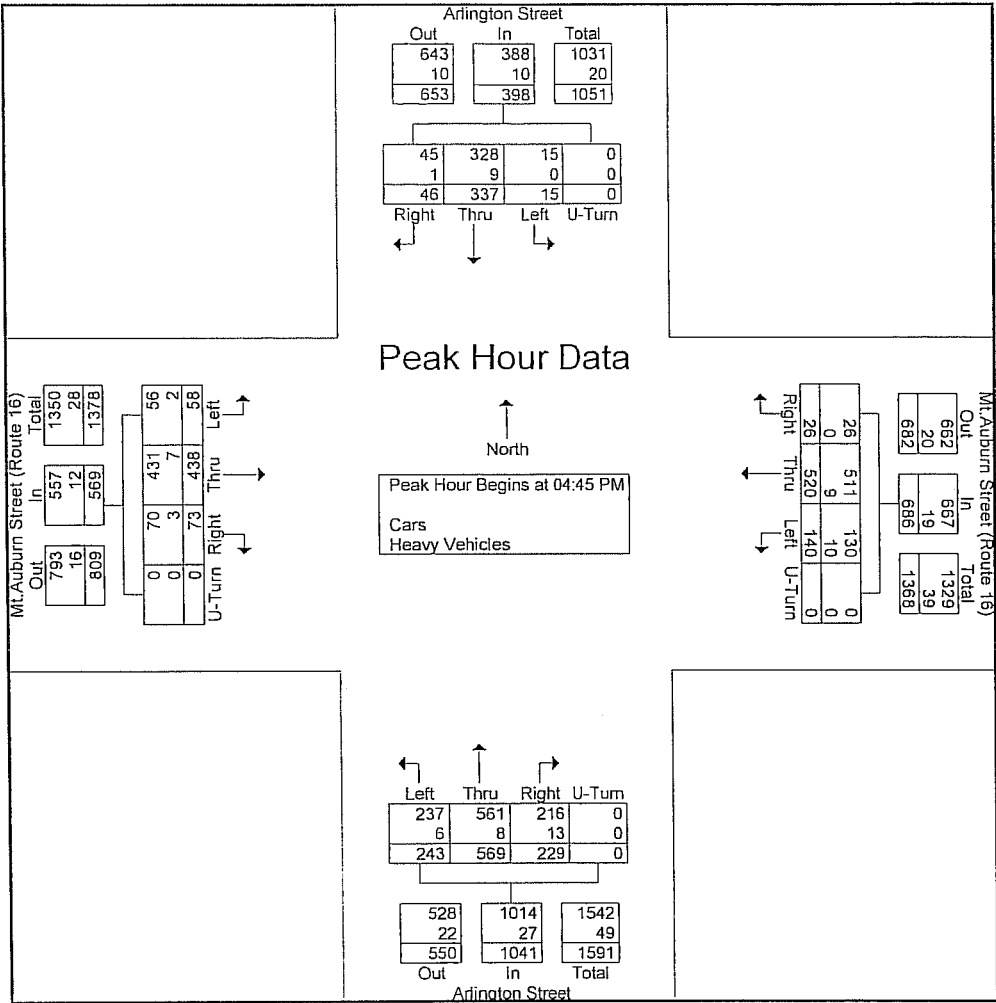
Start Time	Arlington Street From North					Mt.Auburn Street (Route 16) From East					Arlington Street From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	1	0	2	3	0	1	0	0	1	0	0	0	3	3	1	0	0	1	2	9
07:15 AM	0	1	0	1	2	0	1	0	1	2	0	0	0	0	0	0	2	0	1	3	7
07:30 AM	0	1	0	8	9	0	1	0	1	2	0	0	0	5	5	0	2	0	0	2	18
07:45 AM	0	2	0	1	3	0	3	0	4	7	0	0	0	10	10	0	0	0	2	2	22
Total	0	5	0	12	17	0	6	0	6	12	0	0	0	18	18	1	4	0	4	9	56
08:00 AM	0	3	0	4	7	0	2	0	1	3	2	0	0	10	12	1	3	0	0	4	26
08:15 AM	0	1	1	4	6	0	3	0	2	5	0	0	0	10	10	0	3	0	1	4	25
08:30 AM	0	2	0	3	5	0	2	3	1	6	0	0	0	11	11	0	4	0	0	4	26
08:45 AM	0	0	0	3	3	0	3	1	0	4	0	1	0	12	13	1	4	0	1	6	26
Total	0	6	1	14	21	0	10	4	4	18	2	1	0	43	46	2	14	0	2	18	103
Grand Total	0	11	1	26	38	0	16	4	10	30	2	1	0	61	64	3	18	0	6	27	159
Apprch %	0	28.9	2.6	68.4		0	53.3	13.3	33.3		3.1	1.6	0	95.3		11.1	66.7	0	22.2		
Total %	0	6.9	0.6	16.4	23.9	0	10.1	2.5	6.3	18.9	1.3	0.6	0	38.4	40.3	1.9	11.3	0	3.8	17	

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 AAA  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 2



# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

Location: Arlington Street  
From: Mt. Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 AAA  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Cars - Heavy Vehicles

Start Time	Arlington Street From North					Mt. Auburn Street (Route 16) From East					Arlington Street From South					Mt. Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
04:00 PM	13	76	5	0	94	4	121	36	0	161	46	130	66	0	242	22	76	13	0	111	608
04:15 PM	15	75	2	0	92	7	123	58	0	188	51	139	63	0	253	28	89	13	0	130	663
04:30 PM	8	82	6	0	96	6	117	40	0	163	65	130	59	0	254	15	115	9	0	139	652
04:45 PM	10	79	2	0	91	10	123	31	0	164	48	139	57	0	244	23	100	10	0	133	632
Total	46	312	15	0	373	27	484	165	0	676	210	538	245	0	993	88	380	45	0	513	2555
05:00 PM	9	84	3	0	96	6	131	37	0	174	83	138	64	0	285	20	107	15	0	142	697
05:15 PM	12	91	7	0	110	4	136	29	0	169	53	157	60	0	270	17	114	15	0	146	695
05:30 PM	15	83	3	0	101	6	130	43	0	179	45	135	62	0	242	13	117	18	0	148	670
05:45 PM	14	104	6	0	124	1	115	29	0	145	40	128	49	0	217	20	100	8	0	128	614
Total	50	362	19	0	431	17	512	138	0	667	221	558	235	0	1014	70	438	56	0	564	2676
Grand Total	96	674	34	0	804	44	996	303	0	1343	431	1096	480	0	2007	158	818	101	0	1077	5231
Apprch %	11.9	83.8	4.2	0		3.3	74.2	22.6	0		21.5	54.6	23.9	0		14.7	76	9.4	0		
Total %	1.8	12.9	0.6	0	15.4	0.8	19	5.8	0	25.7	8.2	21	9.2	0	38.4	3	15.6	1.9	0	20.6	
Cars	92	660	34	0	786	43	973	281	0	1297	402	1082	473	0	1957	154	794	98	0	1046	5086
% Cars	95.8	97.9	100	0	97.8	97.7	97.7	92.7	0	96.6	93.3	98.7	98.5	0	97.5	97.5	97.1	97	0	97.1	97.2
Heavy Vehicles	4	14	0	0	18	1	23	22	0	46	29	14	7	0	50	4	24	3	0	31	145
% Heavy Vehicles	4.2	2.1	0	0	2.2	2.3	2.3	7.3	0	3.4	6.7	1.3	1.5	0	2.5	2.5	2.9	3	0	2.9	2.8

Start Time	Arlington Street From North					Mt. Auburn Street (Route 16) From East					Arlington Street From South					Mt. Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
04:45 PM	10	79	2	0	91	10	123	31	0	164	48	139	57	0	244	23	100	10	0	133	632
05:00 PM	9	84	3	0	96	6	131	37	0	174	83	138	64	0	285	20	107	15	0	142	697
05:15 PM	12	91	7	0	110	4	136	29	0	169	53	157	60	0	270	17	114	15	0	146	695
05:30 PM	15	83	3	0	101	6	130	43	0	179	45	135	62	0	242	13	117	18	0	148	670
Total Volume	46	337	15	0	398	26	520	140	0	686	229	569	243	0	1041	73	438	58	0	569	2694
App. Total	11.6	84.7	3.8	0		3.8	75.8	20.4	0		22	54.7	23.3	0		12.8	77	10.2	0		
PHF	.767	.926	.536	.000	.905	.650	.956	.814	.000	.958	.690	.906	.949	.000	.913	.793	.936	.806	.000	.961	.966
Cars	45	328	15	0	388	25	511	130	0	667	216	561	237	0	1014	70	431	56	0	557	2626
% Cars	97.8	97.3	100	0	97.5	100	98.3	92.9	0	97.2	94.3	98.6	97.5	0	97.4	95.9	98.4	96.6	0	97.9	97.5
Heavy Vehicles	1	9	0	0	10	0	9	10	0	19	13	8	6	0	27	3	7	2	0	12	68
% Heavy Vehicles	2.2	2.7	0	0	2.5	0	1.7	7.1	0	2.8	5.7	1.4	2.5	0	2.6	4.1	1.6	3.4	0	2.1	2.5

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 AAA  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Peds and Bikes

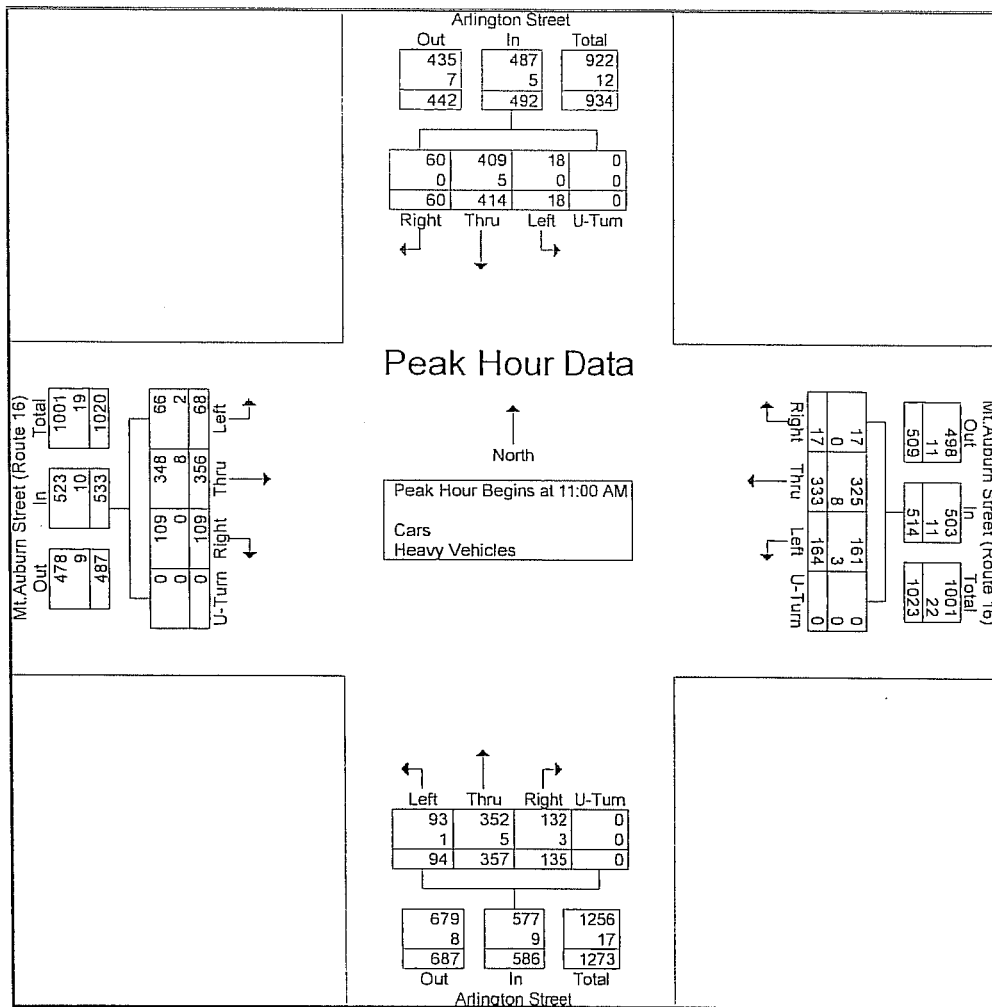
Start Time	Arlington Street From North					Mt.Auburn Street (Route 16) From East					Arlington Street From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	Peds	App Total	Right	Thru	Left	Peds	App Total	Right	Thru	Left	Peds	App Total	Right	Thru	Left	Peds	App Total	
04:00 PM	0	0	0	4	4	0	1	0	1	2	0	0	0	5	5	0	0	0	3	3	14
04:15 PM	0	0	0	2	2	0	1	0	3	4	1	0	0	3	4	0	0	0	2	2	12
04:30 PM	0	0	0	4	4	0	2	0	2	4	0	0	0	4	4	0	1	0	1	2	14
04:45 PM	0	0	0	6	6	0	2	0	4	6	0	1	0	7	8	0	0	0	2	2	22
Total	0	0	0	16	16	0	6	0	10	16	1	1	0	19	21	0	1	0	8	9	62
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	0	0	2	2	8
05:15 PM	0	0	0	1	1	0	1	0	2	3	0	3	0	7	10	0	0	0	1	1	15
05:30 PM	0	0	0	3	3	1	3	1	1	6	0	1	0	2	3	0	1	0	0	1	13
05:45 PM	0	1	0	5	6	0	2	2	3	7	0	1	1	7	9	0	1	0	2	3	25
Total	0	1	0	9	10	1	6	3	6	16	0	5	1	22	28	0	2	0	5	7	61
Grand Total	0	1	0	25	26	1	12	3	16	32	1	6	1	41	49	0	3	0	13	16	123
Apprch %	0	3.8	0	96.2		3.1	37.5	9.4	50		2	12.2	2	83.7		0	18.8	0	81.2		
Total %	0	0.8	0	20.3	21.1	0.8	9.8	2.4	13	26	0.8	4.9	0.8	33.3	39.8	0	2.4	0	10.6	13	

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 A  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 2



# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 A  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 1

## Groups Printed- Cars - Heavy Vehicles

Start Time	Arlington Street From North					Mt.Auburn Street (Route 16) From East					Arlington Street From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
11:00 AM	9	107	4	0	120	3	98	43	0	144	39	94	27	0	160	23	76	14	0	113	537
11:15 AM	17	88	3	0	108	2	80	49	0	131	34	83	17	0	134	31	89	23	0	143	516
11:30 AM	16	110	7	0	133	4	72	32	0	108	37	99	20	0	156	21	91	15	0	127	524
11:45 AM	18	109	4	0	131	8	83	40	0	131	25	81	30	0	136	34	100	16	0	150	548
Total	60	414	18	0	492	17	333	164	0	514	135	357	94	0	586	109	356	68	0	533	2125
12:00 PM	21	73	4	0	98	4	80	49	0	133	33	81	32	0	146	27	100	24	0	151	528
12:15 PM	12	85	4	0	101	9	98	38	0	145	32	68	26	0	126	35	86	19	0	140	512
12:30 PM	16	86	9	0	111	4	87	43	0	134	41	82	21	0	144	23	92	17	0	132	521
12:45 PM	15	91	3	0	109	8	71	51	0	130	38	50	21	0	109	37	90	20	0	147	495
Total	64	335	20	0	419	25	336	181	0	542	144	281	100	0	525	122	368	80	0	570	2056
Grand Total	124	749	38	0	911	42	669	345	0	1056	279	638	194	0	1111	231	724	148	0	1103	4181
Apprch %	13.6	82.2	4.2	0		4	63.4	32.7	0		25.1	57.4	17.5	0		20.9	65.6	13.4	0		
Total %	3	17.9	0.9	0	21.8	1	16	8.3	0	25.3	6.7	15.3	4.6	0	26.6	5.5	17.3	3.5	0	26.4	
Cars	123	741	37	0	901	42	651	341	0	1034	272	629	193	0	1094	229	707	145	0	1081	4110
% Cars	99.2	98.9	97.4	0	98.9	100	97.3	98.8	0	97.9	97.5	98.6	99.5	0	98.5	99.1	97.7	98	0	98	98.3
Heavy Vehicles	1	8	1	0	10	0	18	4	0	22	7	9	1	0	17	2	17	3	0	22	71
% Heavy Vehicles	0.8	1.1	2.6	0	1.1	0	2.7	1.2	0	2.1	2.5	1.4	0.5	0	1.5	0.9	2.3	2	0	2	1.7

Start Time	Arlington Street From North					Mt.Auburn Street (Route 16) From East					Arlington Street From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	9	107	4	0	120	3	98	43	0	144	39	94	27	0	160	23	76	14	0	113	537
11:15 AM	17	88	3	0	108	2	80	49	0	131	34	83	17	0	134	31	89	23	0	143	516
11:30 AM	16	110	7	0	133	4	72	32	0	108	37	99	20	0	156	21	91	15	0	127	524
11:45 AM	18	109	4	0	131	8	83	40	0	131	25	81	30	0	136	34	100	16	0	150	548
Total Volume	60	414	18	0	492	17	333	164	0	514	135	357	94	0	586	109	356	68	0	533	2125
App. Total	12.2	84.1	3.7	0		3.3	64.8	31.9	0		23	60.9	16	0		20.5	66.8	12.8	0		
PHF	.833	.941	.643	.000	.925	.531	.849	.837	.000	.892	.865	.902	.783	.000	.916	.801	.890	.739	.000	.888	.969
Cars	60	409	18	0	487	17	325	161	0	503	132	352	93	0	577	109	348	66	0	523	2090
% Cars	100	98.8	100	0	99.0	100	97.6	98.2	0	97.9	97.8	98.6	98.9	0	98.5	100	97.8	97.1	0	98.1	98.4
Heavy Vehicles	0	5	0	0	5	0	8	3	0	11	3	5	1	0	9	0	8	2	0	10	35
% Heavy Vehicles	0	1.2	0	0	1.0	0	2.4	1.8	0	2.1	2.2	1.4	1.1	0	1.5	0	2.2	2.9	0	1.9	1.6

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 A  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 1

## Groups Printed- Peds and Bikes

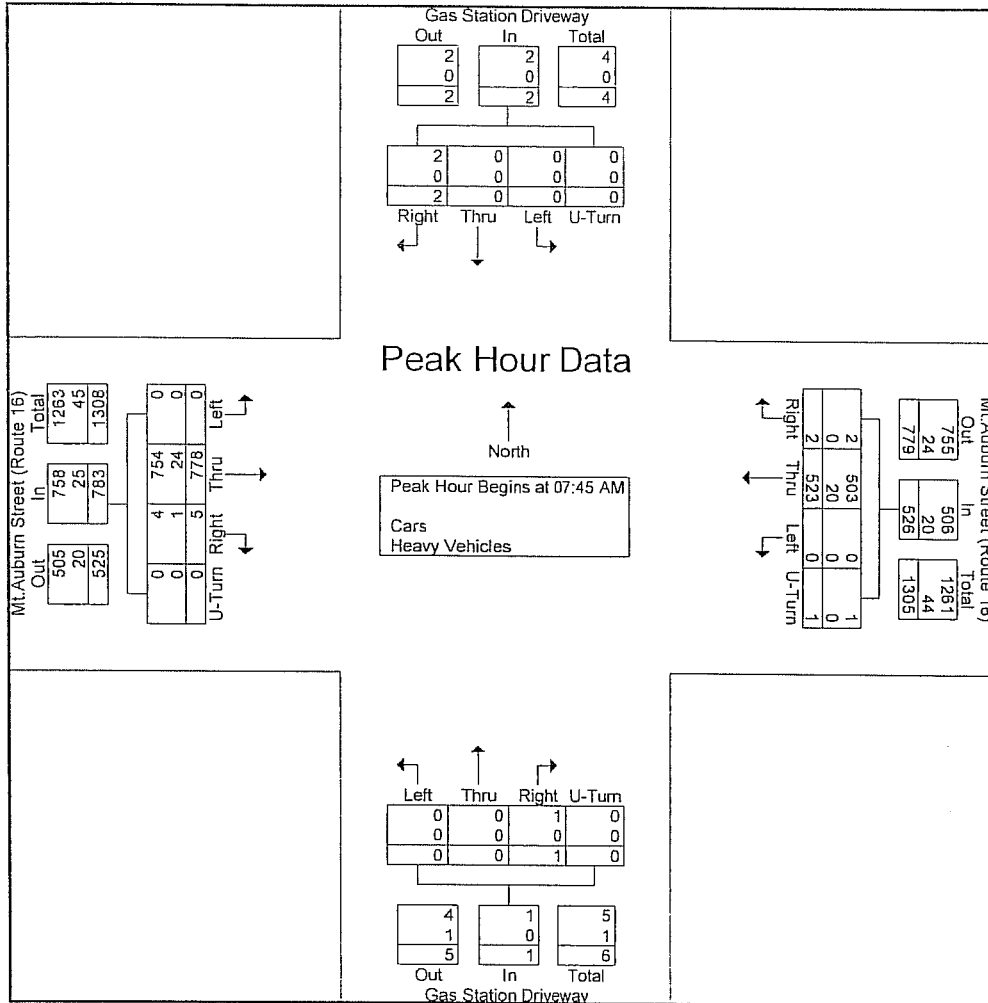
Start Time	Arlington Street From North					Mt.Auburn Street (Route 16) From East					Arlington Street From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
11:00 AM	0	0	0	6	6	0	0	0	2	2	0	1	0	9	10	0	1	0	0	1	19
11:15 AM	0	0	0	7	7	0	1	0	3	4	0	0	0	8	8	0	0	0	0	0	19
11:30 AM	0	1	0	8	9	0	1	0	4	5	0	0	0	8	8	0	1	0	7	8	30
11:45 AM	0	0	0	3	3	0	1	0	1	2	0	0	0	4	4	0	0	0	6	6	15
Total	0	1	0	24	25	0	3	0	10	13	0	1	0	29	30	0	2	0	13	15	83
12:00 PM	0	1	0	7	8	0	0	0	1	1	0	2	0	4	6	0	2	0	2	4	19
12:15 PM	0	0	0	8	8	0	1	0	4	5	0	1	0	6	7	0	0	0	5	5	25
12:30 PM	0	0	0	3	3	0	1	0	0	1	1	2	0	6	9	0	2	0	3	5	18
12:45 PM	0	0	0	14	14	0	1	2	0	3	0	1	0	1	2	1	0	0	0	1	20
Total	0	1	0	32	33	0	3	2	5	10	1	6	0	17	24	1	4	0	10	15	82
Grand Total	0	2	0	56	58	0	6	2	15	23	1	7	0	46	54	1	6	0	23	30	165
Apprch %	0	3.4	0	96.6		0	26.1	8.7	65.2		1.9	13	0	85.2		3.3	20	0	76.7		
Total %	0	1.2	0	33.9	35.2	0	3.6	1.2	9.1	13.9	0.6	4.2	0	27.9	32.7	0.6	3.6	0	13.9	18.2	

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

VS: Gas Station / Gas Station Driveway  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 BB  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 2



# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

Location: Gas Station / Gas Station Driveway  
Approach: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 BB  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Cars - Heavy Vehicles

Start Time	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
07:00 AM	0	0	0	0	0	2	84	0	0	86	0	0	0	0	0	0	179	1	0	180	266
07:15 AM	0	0	0	0	0	1	118	0	0	119	0	0	0	0	0	0	152	1	1	154	273
07:30 AM	1	0	0	0	1	2	111	0	0	113	0	0	1	0	1	1	195	0	0	196	311
07:45 AM	1	0	0	0	1	1	127	0	0	128	0	0	0	0	0	1	221	0	0	222	351
Total	2	0	0	0	2	6	440	0	0	446	0	0	1	0	1	2	747	2	1	752	1201
08:00 AM	0	0	0	0	0	0	136	0	0	136	0	0	0	0	0	2	202	0	0	204	340
08:15 AM	1	0	0	0	1	0	130	0	1	131	1	0	0	0	1	1	189	0	0	190	323
08:30 AM	0	0	0	0	0	1	130	0	0	131	0	0	0	0	0	1	166	0	0	167	298
08:45 AM	1	0	0	0	1	1	124	0	0	125	1	0	1	0	2	0	178	0	0	178	306
Total	2	0	0	0	2	2	520	0	1	523	2	0	1	0	3	4	735	0	0	739	1267
Grand Total	4	0	0	0	4	8	960	0	1	969	2	0	2	0	4	6	1482	2	1	1491	2468
Apprch %	100	0	0	0		0.8	99.1	0	0.1		50	0	50	0		0.4	99.4	0.1	0.1		
Total %	0.2	0	0	0	0.2	0.3	38.9	0	0	39.3	0.1	0	0.1	0	0.2	0.2	60	0.1	0	60.4	
Cars	4	0	0	0	4	7	908	0	1	916	2	0	1	0	3	4	1425	2	1	1432	2355
% Cars	100	0	0	0	100	87.5	94.6	0	100	94.5	100	0	50	0	75	66.7	96.2	100	100	96	95.4
Heavy Vehicles	0	0	0	0	0	1	52	0	0	53	0	0	1	0	1	2	57	0	0	59	113
% Heavy Vehicles	0	0	0	0	0	12.5	5.4	0	0	5.5	0	0	50	0	25	33.3	3.8	0	0	4	4.6

Start Time	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
07:45 AM	1	0	0	0	1	1	127	0	0	128	0	0	0	0	0	1	221	0	0	222	351
08:00 AM	0	0	0	0	0	0	136	0	0	136	0	0	0	0	0	2	202	0	0	204	340
08:15 AM	1	0	0	0	1	0	130	0	1	131	1	0	0	0	1	1	189	0	0	190	323
08:30 AM	0	0	0	0	0	1	130	0	0	131	0	0	0	0	0	1	166	0	0	167	298
Total Volume	2	0	0	0	2	2	523	0	1	526	1	0	0	0	1	5	778	0	0	783	1312
App. Total	100	0	0	0		0.4	99.4	0	0.2		100	0	0	0		0.6	99.4	0	0		
PHF	.500	.000	.000	.000	.500	.500	.961	.000	.250	.967	.250	.000	.000	.000	.250	.625	.880	.000	.000	.882	.934
Cars	2	0	0	0	2	2	503	0	1	506	1	0	0	0	1	4	754	0	0	758	1267
% Cars	100	0	0	0	100	100	96.2	0	100	96.2	100	0	0	0	100	80.0	96.9	0	0	96.8	96.6
Heavy Vehicles	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	1	24	0	0	25	45
% Heavy Vehicles	0	0	0	0	0	0	3.8	0	0	3.8	0	0	0	0	0	20.0	3.1	0	0	3.2	3.4

Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:45 AM

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Gas Station / Gas Station Driveway  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 BB  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Peds and Bikes

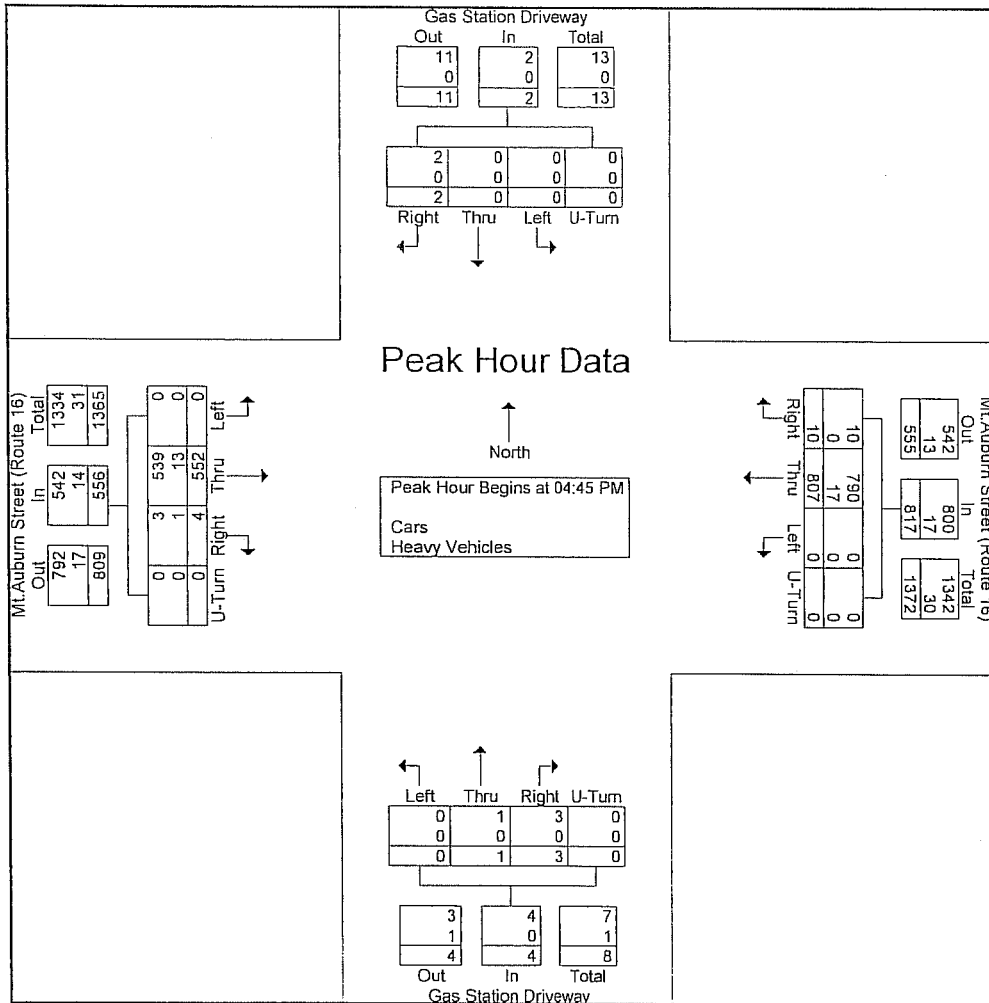
Start Time	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	0	0	0	2	2	0	1	0	1	2	0	0	0	7	7	0	1	0	0	1	12
07:15 AM	0	0	0	2	2	0	1	0	2	3	0	0	0	1	1	0	2	0	2	4	10
07:30 AM	0	0	0	8	8	0	1	0	1	2	0	0	0	8	8	0	1	0	1	2	20
07:45 AM	0	0	0	3	3	0	3	0	1	4	0	0	0	7	7	0	0	0	1	1	15
Total	0	0	0	15	15	0	6	0	5	11	0	0	0	23	23	0	4	0	4	8	57
08:00 AM	0	0	0	1	1	0	2	0	0	2	0	0	0	20	20	0	4	0	0	4	27
08:15 AM	0	0	0	6	6	0	3	0	4	7	0	0	0	11	11	0	2	0	0	2	26
08:30 AM	0	0	0	3	3	0	2	0	2	4	0	0	0	15	15	0	4	0	0	4	26
08:45 AM	0	0	0	3	3	0	2	0	0	2	0	0	0	14	14	0	5	0	0	5	24
Total	0	0	0	13	13	0	9	0	6	15	0	0	0	60	60	0	15	0	0	15	103
Grand Total	0	0	0	28	28	0	15	0	11	26	0	0	0	83	83	0	19	0	4	23	160
Apprch %	0	0	0	100		0	57.7	0	42.3		0	0	0	100		0	82.6	0	17.4		
Total %	0	0	0	17.5	17.5	0	9.4	0	6.9	16.2	0	0	0	51.9	51.9	0	11.9	0	2.5	14.4	

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Gas Station / Gas Station Driveway  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 BBB  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 2



# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Gas Station / Gas Station Driveway  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 BBB  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Cars - Heavy Vehicles

Start Time	Gas Station Driveway From North						Mt.Auburn Street (Route 16) From East						Gas Station Driveway From South						Mt.Auburn Street (Route 16) From West						Int. Total
	Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		Right	Thru	Left	U-Turn	App. Total		
04:00 PM	1	0	0	0	1		6	196	0	0	202		0	0	0	0	0		3	115	1	0	119		322
04:15 PM	1	0	0	0	1		3	199	0	0	202		0	0	0	0	0		0	126	0	0	126		329
04:30 PM	0	0	0	0	0		1	185	0	0	186		2	0	1	0	3		0	138	0	0	138		327
04:45 PM	1	0	0	0	1		5	190	0	0	195		1	0	0	0	1		1	129	0	0	130		327
Total	3	0	0	0	3		15	770	0	0	785		3	0	1	0	4		4	508	1	0	513		1305
05:00 PM	1	0	0	0	1		2	205	0	0	207		0	0	0	0	0		0	142	0	0	142		350
05:15 PM	0	0	0	0	0		1	208	0	0	209		1	0	0	0	1		3	137	0	0	140		350
05:30 PM	0	0	0	0	0		2	204	0	0	206		1	1	0	0	2		0	144	0	0	144		352
05:45 PM	0	0	0	0	0		1	179	0	0	180		0	0	0	0	0		0	129	0	0	129		309
Total	1	0	0	0	1		6	796	0	0	802		2	1	0	0	3		3	552	0	0	555		1361
Grand Total	4	0	0	0	4		21	1566	0	0	1587		5	1	1	0	7		7	1060	1	0	1068		2666
Apprch %	100	0	0	0			1.3	98.7	0	0			71.4	14.3	14.3	0			0.7	99.3	0.1	0			
Total %	0.2	0	0	0	0.2		0.8	58.7	0	0	59.5		0.2	0	0	0	0.3		0.3	39.8	0	0	40.1		
Cars	4	0	0	0	4		21	1531	0	0	1552		5	1	1	0	7		6	1027	1	0	1034		2597
% Cars	100	0	0	0	100		100	97.8	0	0	97.8		100	100	100	0	100		85.7	96.9	100	0	96.8		97.4
Heavy Vehicles	0	0	0	0	0		0	35	0	0	35		0	0	0	0	0		1	33	0	0	34		69
% Heavy Vehicles	0	0	0	0	0		0	2.2	0	0	2.2		0	0	0	0	0		14.3	3.1	0	0	3.2		2.6

	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	1	0	0	0	1	5	190	0	0	195	1	0	0	0	1	1	129	0	0	130	327
05:00 PM	1	0	0	0	1	2	205	0	0	207	0	0	0	0	0	0	142	0	0	142	350
05:15 PM	0	0	0	0	0	1	208	0	0	209	1	0	0	0	1	3	137	0	0	140	350
05:30 PM	0	0	0	0	0	2	204	0	0	206	1	1	0	0	2	0	144	0	0	144	352
Total Volume	2	0	0	0	2	10	807	0	0	817	3	1	0	0	4	4	552	0	0	556	1379
App. Total	100	0	0	0		1.2	98.8	0	0		75	25	0	0		0.7	99.3	0	0		
PHF	.500	.000	.000	.000	.500	.500	.970	.000	.000	.977	.750	.250	.000	.000	.500	.333	.958	.000	.000	.965	.979
Cars	2	0	0	0	2	10	790	0	0	800	3	1	0	0	4	3	539	0	0	542	1348
% Cars	100	0	0	0	100	100	97.9	0	0	97.9	100	100	0	0	100	75.0	97.6	0	0	97.5	97.8
Heavy Vehicles	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	1	13	0	0	14	31
% Heavy Vehicles	0	0	0	0	0	0	2.1	0	0	2.1	0	0	0	0	0	25.0	2.4	0	0	2.5	2.2

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Gas Station / Gas Station Driveway  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 BBB  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Peds and Bikes

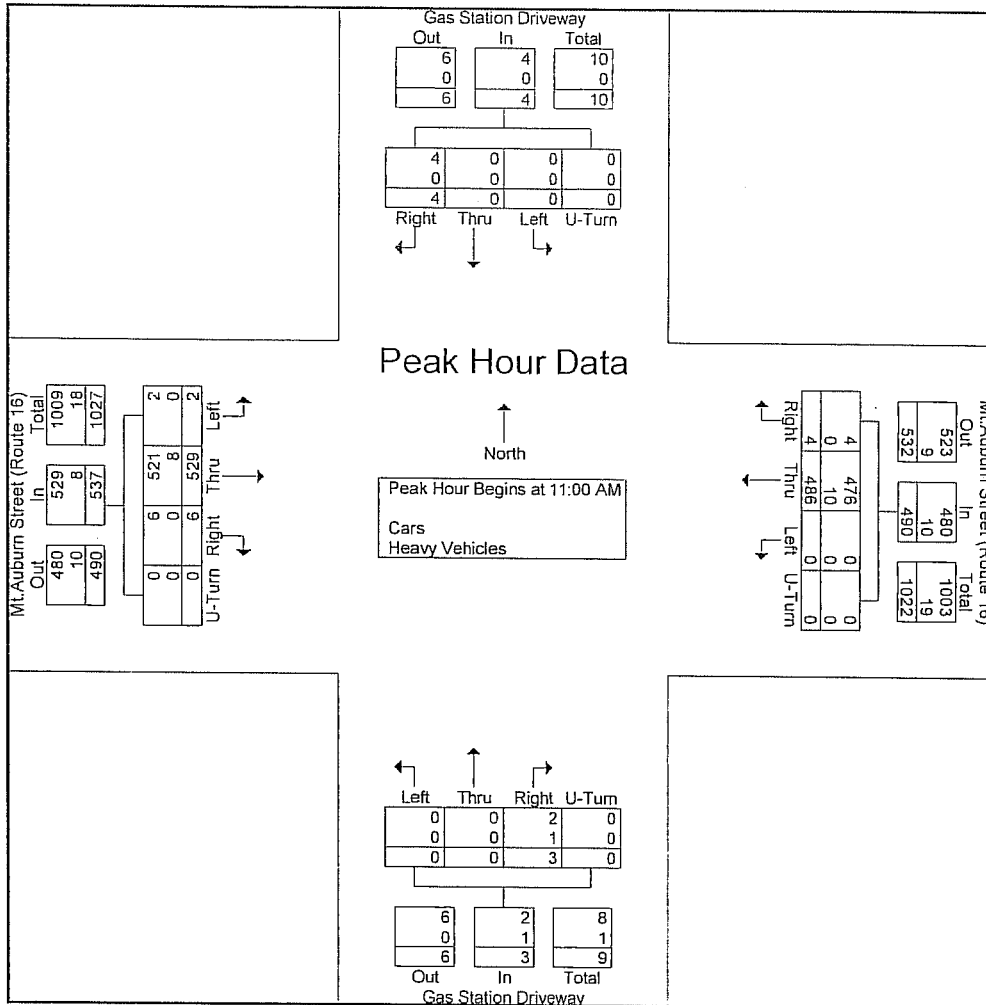
Start Time	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	0	0	6	6	0	1	0	3	4	0	0	0	2	2	0	0	0	0	0	12
04:15 PM	0	0	0	2	2	0	3	0	1	4	0	0	0	0	0	0	0	0	0	0	6
04:30 PM	1	0	0	4	5	0	2	0	0	2	0	0	0	4	4	0	2	0	0	2	13
04:45 PM	0	0	0	6	6	0	2	0	2	4	0	0	0	5	5	0	0	0	0	0	15
Total	1	0	0	18	19	0	8	0	6	14	0	0	0	11	11	0	2	0	0	2	46
05:00 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	6	6	0	2	0	0	2	9
05:15 PM	0	0	0	0	0	0	2	0	1	3	0	0	0	4	4	0	1	0	1	2	9
05:30 PM	0	0	0	3	3	0	3	0	0	3	0	0	0	3	3	0	2	0	0	2	11
05:45 PM	0	0	0	6	6	0	3	0	2	5	0	0	0	8	8	0	1	0	0	1	20
Total	0	0	0	10	10	0	8	0	3	11	0	0	0	21	21	0	6	0	1	7	49
Grand Total	1	0	0	28	29	0	16	0	9	25	0	0	0	32	32	0	8	0	1	9	95
Apprch %	3.4	0	0	96.6		0	64	0	36		0	0	0	100		0	88.9	0	11.1		
Total %	1.1	0	0	29.5	30.5	0	16.8	0	9.5	26.3	0	0	0	33.7	33.7	0	8.4	0	1.1	9.5	

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Gas Station / Gas Station Driveway  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 B  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 2



# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Gas Station / Gas Station Driveway  
W: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Agent: MDM/ C. Jones

File Name : 133646 B  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 1

## Groups Printed- Cars - Heavy Vehicles

Start Time	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
1:00 AM	0	0	0	0	0	0	140	0	0	140	0	0	0	0	0	3	115	0	0	118	258
1:15 AM	3	0	0	0	3	0	109	0	0	109	0	0	0	0	0	1	144	1	0	146	258
1:30 AM	0	0	0	0	0	2	104	0	0	106	0	0	0	0	0	1	127	0	0	128	234
1:45 AM	1	0	0	0	1	2	133	0	0	135	3	0	0	0	3	1	143	1	0	145	284
Total	4	0	0	0	4	4	486	0	0	490	3	0	0	0	3	6	529	2	0	537	1034
2:00 PM	2	0	0	0	2	1	132	0	0	133	2	0	0	0	2	1	152	0	0	153	290
2:15 PM	0	0	0	0	0	3	134	0	0	137	2	0	1	0	3	0	137	0	0	137	277
2:30 PM	0	0	0	0	0	2	125	0	0	127	0	0	0	0	0	1	133	0	0	134	261
2:45 PM	0	0	0	0	0	3	108	0	0	111	0	0	0	0	0	1	143	0	0	144	255
Total	2	0	0	0	2	9	499	0	0	508	4	0	1	0	5	3	565	0	0	568	1083
Grand Total	6	0	0	0	6	13	985	0	0	998	7	0	1	0	8	9	1094	2	0	1105	2117
Approach %	100	0	0	0		1.3	98.7	0	0		87.5	0	12.5	0		0.8	99	0.2	0		
Total %	0.3	0	0	0	0.3	0.6	46.5	0	0	47.1	0.3	0	0	0	0.4	0.4	51.7	0.1	0	52.2	
Cars	6	0	0	0	6	13	964	0	0	977	6	0	1	0	7	9	1075	2	0	1086	2076
% Cars	100	0	0	0	100	100	97.9	0	0	97.9	85.7	0	100	0	87.5	100	98.3	100	0	98.3	98.1
Heavy Vehicles	0	0	0	0	0	0	21	0	0	21	1	0	0	0	1	0	19	0	0	19	41
Heavy Vehicles	0	0	0	0	0	0	2.1	0	0	2.1	14.3	0	0	0	12.5	0	1.7	0	0	1.7	1.9

	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	0	0	0	0	0	0	140	0	0	140	0	0	0	0	0	3	115	0	0	118	258
11:15 AM	3	0	0	0	3	0	109	0	0	109	0	0	0	0	0	1	144	1	0	146	258
11:30 AM	0	0	0	0	0	2	104	0	0	106	0	0	0	0	0	1	127	0	0	128	234
11:45 AM	1	0	0	0	1	2	133	0	0	135	3	0	0	0	3	1	143	1	0	145	284
Total Volume	4	0	0	0	4	4	486	0	0	490	3	0	0	0	3	6	529	2	0	537	1034
App. Total	100	0	0	0		0.8	99.2	0	0		100	0	0	0		1.1	98.5	0.4	0		
PHF	.333	.000	.000	.000	.333	.500	.868	.000	.000	.875	.250	.000	.000	.000	.250	.500	.918	.500	.000	.920	.910
Cars	4	0	0	0	4	4	476	0	0	480	2	0	0	0	2	6	521	2	0	529	1015
% Cars	100	0	0	0	100	100	97.9	0	0	98.0	66.7	0	0	0	66.7	100	98.5	100	0	98.5	98.2
Heavy Vehicles	0	0	0	0	0	0	10	0	0	10	1	0	0	0	1	0	8	0	0	8	19
Heavy Vehicles	0	0	0	0	0	0	2.1	0	0	2.0	33.3	0	0	0	33.3	0	1.5	0	0	1.5	1.8

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

VS: Gas Station / Gas Station Driveway  
RW: Mt.Auburn Street (Route 16)  
City, State: Watertown, MA  
Client: MDM/ C. Jones

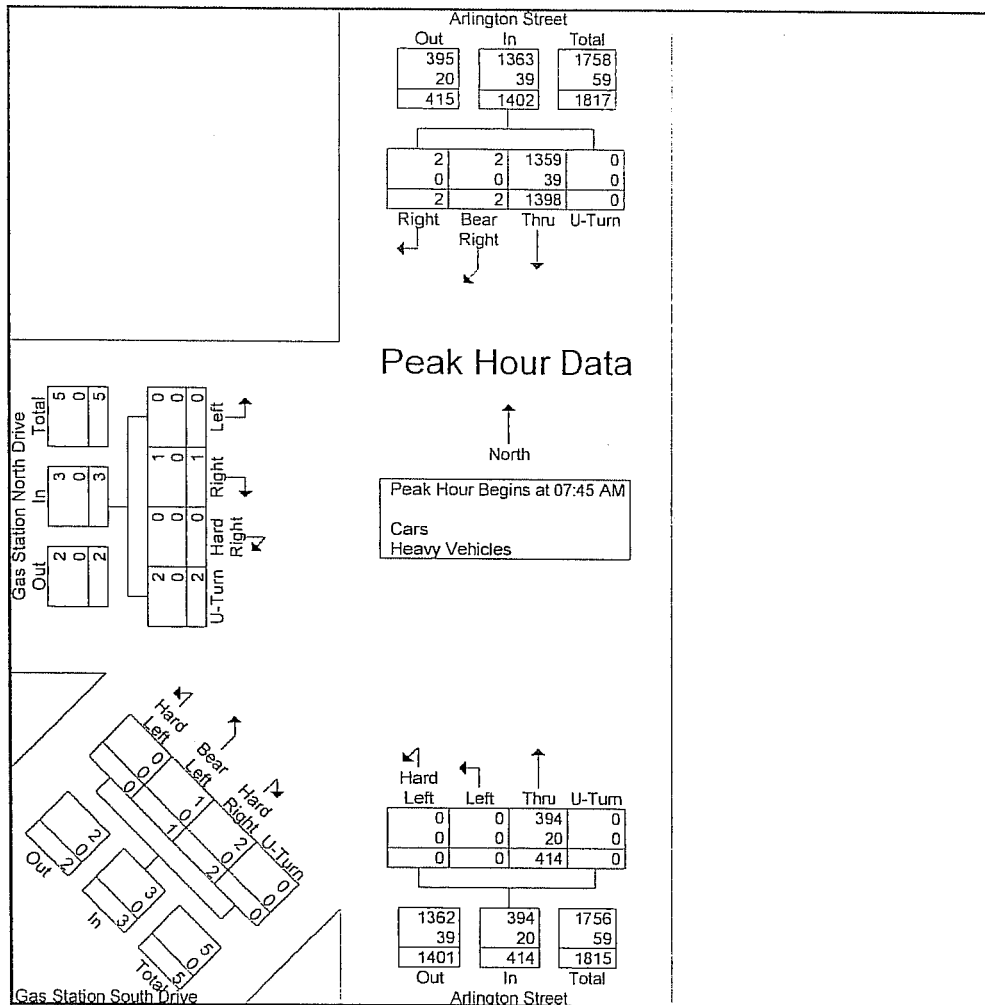
File Name : 133646 B  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 1

## Groups Printed- Peds and Bikes

Start Time	Gas Station Driveway From North					Mt.Auburn Street (Route 16) From East					Gas Station Driveway From South					Mt.Auburn Street (Route 16) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
11:00 AM	0	0	0	2	2	0	0	0	0	0	0	0	0	16	16	0	3	0	1	4	22
11:15 AM	0	0	0	10	10	0	1	0	0	1	0	0	0	10	10	0	0	0	0	0	21
11:30 AM	0	0	0	3	3	0	0	0	2	2	0	0	0	14	14	0	1	0	0	1	20
11:45 AM	0	0	0	1	1	0	1	0	4	5	0	0	0	5	5	0	3	0	0	3	14
Total	0	0	0	16	16	0	2	0	6	8	0	0	0	45	45	0	7	0	1	8	77
12:00 PM	0	0	0	9	9	0	1	0	2	3	0	0	0	9	9	0	3	0	0	3	24
12:15 PM	0	0	0	7	7	0	1	0	5	6	0	0	0	15	15	0	0	0	1	1	29
12:30 PM	0	0	0	2	2	0	1	0	3	4	0	0	0	7	7	0	4	0	0	4	17
12:45 PM	0	0	0	15	15	0	1	0	0	1	0	0	0	12	12	0	2	0	1	3	31
Total	0	0	0	33	33	0	4	0	10	14	0	0	0	43	43	0	9	0	2	11	101
Grand Total	0	0	0	49	49	0	6	0	16	22	0	0	0	88	88	0	16	0	3	19	178
Apprch %	0	0	0	100		0	27.3	0	72.7		0	0	0	100		0	84.2	0	15.8		
Total %	0	0	0	27.5	27.5	0	3.4	0	9	12.4	0	0	0	49.4	49.4	0	9	0	1.7	10.7	

28 Lord Road, Suite 280  
Marlborough, MA 01752

File Name : 133646 CC  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 2



28 Lord Road, Suite 280  
Marlborough, MA 01752

File Name : 133646 CC  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

[illegible]

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
/SW: Gas Station North/Gas Station South  
ty, State: Watertown, MA  
ient: MDM/ C. Jones

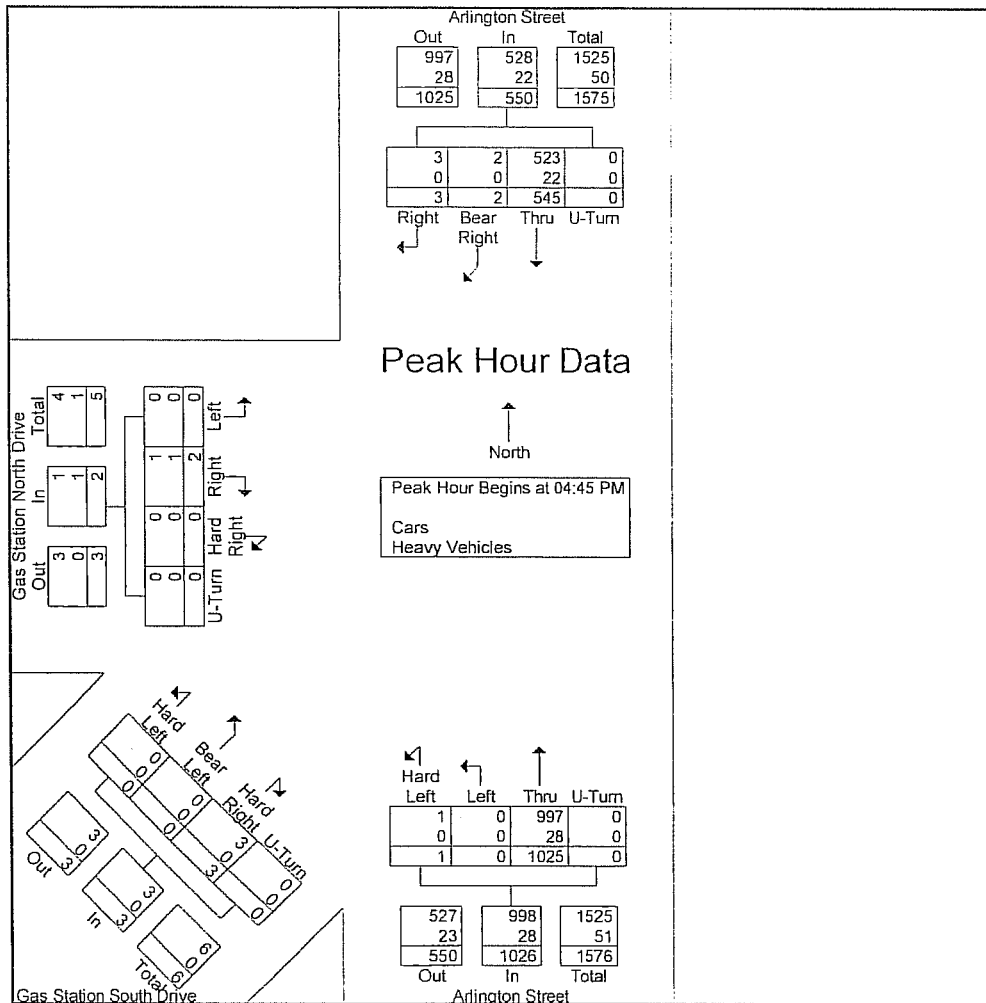
File Name : 133646 CC  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Peds and Bikes

Start Time	Arlington Street From North					Arlington Street From South					Gas Station South Drive From Southwest					Gas Station North Drive From West					Int. Total
	Right	Left	Thru	Peds	App. Total	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Left	Hard Left	Peds	App. Total	Hard Right	Right	Left	Peds	App. Total	
07:00 AM	0	0	0	4	4	8	0	0	0	8	0	0	0	3	3	0	0	0	1	1	16
07:15 AM	0	0	2	0	2	14	0	0	0	14	0	0	0	0	0	0	0	0	0	0	16
07:30 AM	0	0	1	4	5	8	0	0	0	8	0	0	0	1	1	0	0	0	1	1	15
07:45 AM	0	0	2	10	12	7	0	0	0	7	0	1	0	3	4	0	0	0	2	2	25
Total	0	0	5	18	23	37	0	0	0	37	0	1	0	7	8	0	0	0	4	4	72
08:00 AM	0	0	5	10	15	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	18
08:15 AM	0	0	1	9	10	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	11
08:30 AM	0	0	2	10	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
08:45 AM	0	0	3	3	6	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	8
Total	0	0	11	32	43	4	0	0	0	4	0	0	0	2	2	0	0	0	0	0	49
Grand Total	0	0	16	50	66	41	0	0	0	41	0	1	0	9	10	0	0	0	4	4	121
Apprch %	0	0	24.2	75.8		100	0	0	0		0	10	0	90		0	0	0	100		
Total %	0	0	13.2	41.3	54.5	33.9	0	0	0	33.9	0	0.8	0	7.4	8.3	0	0	0	3.3	3.3	

28 Lord Road, Suite 280  
Marlborough, MA 01752

File Name : 133646 CCC  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 2



# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

Location: Arlington Street  
Approach: Gas Station North/Gas Station South  
City, State: Watertown, MA  
Client: MDM/ C. Jones

File Name : 133646 CCC  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Cars - Heavy Vehicles

Start Time	Arlington Street From North					Arlington Street From South					Gas Station South Drive From Southwest					Gas Station North Drive From West					Int. Total
	Right	Beav Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Beav Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	
04:00 PM	1	0	132	0	133	240	0	0	0	240	0	0	0	0	0	0	0	1	0	1	374
04:15 PM	0	0	161	0	161	255	0	0	0	255	1	0	0	0	1	0	0	0	0	0	417
04:30 PM	1	0	137	0	138	249	1	1	0	251	0	0	0	0	0	0	0	0	0	0	389
04:45 PM	1	1	132	0	134	251	0	0	0	251	0	0	0	0	0	0	0	0	0	0	385
Total	3	1	562	0	566	995	1	1	0	997	1	0	0	0	1	0	0	1	0	1	1565
05:00 PM	0	0	140	0	140	272	0	1	0	273	2	0	0	0	2	0	0	0	0	0	415
05:15 PM	1	0	138	0	139	259	0	0	0	259	0	0	0	0	0	0	2	0	0	2	400
05:30 PM	1	1	135	0	137	243	0	0	0	243	1	0	0	0	1	0	0	0	0	0	381
05:45 PM	0	0	152	0	152	213	0	0	0	213	1	0	0	0	1	0	0	0	0	0	366
Total	2	1	565	0	568	987	0	1	0	988	4	0	0	0	4	0	2	0	0	2	1562
Grand Total	5	2	1127	0	1134	1982	1	2	0	1985	5	0	0	0	5	0	2	1	0	3	3127
Approach %	0.4	0.2	99.4	0		99.8	0.1	0.1	0		100	0	0	0		0	66.7	33.3	0		
Total %	0.2	0.1	36	0	36.3	63.4	0	0.1	0	63.5	0.2	0	0	0	0.2	0	0.1	0	0	0.1	
% Cars	5	2	1087	0	1094	1932	1	2	0	1935	5	0	0	0	5	0	1	1	0	2	3036
% Heavy Vehicles	100	100	96.5	0	96.5	97.5	100	100	0	97.5	100	0	0	0	100	0	50	100	0	66.7	97.1
% Heavy Vehicles	0	0	40	0	40	50	0	0	0	50	0	0	0	0	0	0	1	0	0	1	91
% Heavy Vehicles	0	0	3.5	0	3.5	2.5	0	0	0	2.5	0	0	0	0	0	0	50	0	0	33.3	2.9

	Arlington Street From North					Arlington Street From South					Gas Station South Drive From Southwest					Gas Station North Drive From West					
Start Time	Right	Bear Right	Thru	U-Turn	App. Total	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	1	1	132	0	134	251	0	0	0	251	0	0	0	0	0	0	0	0	0	0	385
05:00 PM	0	0	140	0	140	272	0	1	0	273	2	0	0	0	2	0	0	0	0	0	415
05:15 PM	1	0	138	0	139	259	0	0	0	259	0	0	0	0	0	0	2	0	0	2	400
05:30 PM	1	1	135	0	137	243	0	0	0	243	1	0	0	0	1	0	0	0	0	0	381
Total Volume	3	2	545	0	550	1025	0	1	0	1026	3	0	0	0	3	0	2	0	0	2	1581
% App. Total	0.5	0.4	99.1	0		99.9	0	0.1	0		100	0	0	0		0	100	0	0		
PHF	.750	.500	.973	.000	.982	.942	.000	.250	.000	.940	.375	.000	.000	.000	.375	.000	.250	.000	.000	.250	.952
% Cars	3	2	523	0	528	997	0	1	0	998	3	0	0	0	3	0	1	0	0	1	1530
% Heavy Vehicles	100	100	96.0	0	96.0	97.3	0	100	0	97.3	100	0	0	0	100	0	50.0	0	0	50.0	96.8
% Heavy Vehicles	0	0	22	0	22	28	0	0	0	28	0	0	0	0	0	0	1	0	0	1	51
% Heavy Vehicles	0	0	4.0	0	4.0	2.7	0	0	0	2.7	0	0	0	0	0	0	50.0	0	0	50.0	3.2

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
/SW: Gas Station North/Gas Station South  
ty, State: Watertown, MA  
ient: MDM/ C. Jones

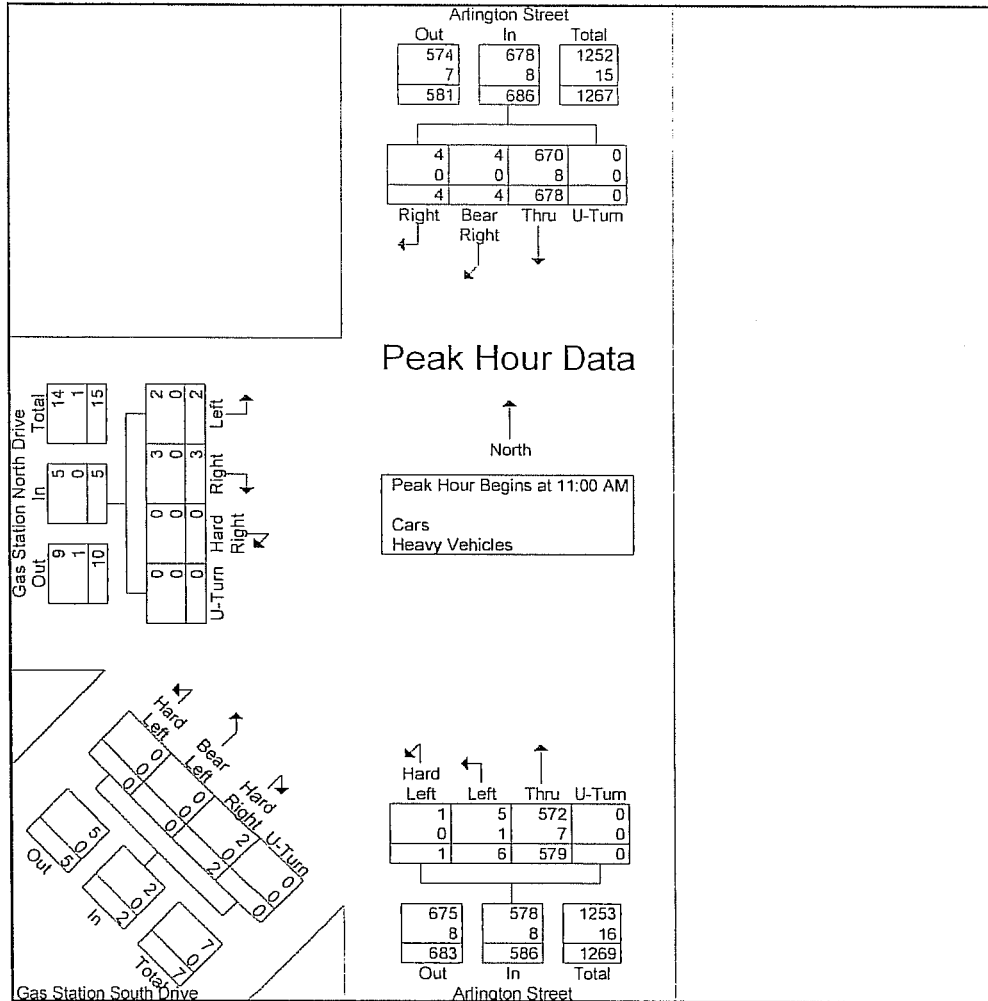
File Name : 133646 CCC  
Site Code : 743  
Start Date : 11/19/2013  
Page No : 1

## Groups Printed- Peds and Bikes

Start Time	Arlington Street From North					Arlington Street From South					Gas Station South Drive From Southwest					Gas Station North Drive From West					Int. Total
	Right	Bear Right	Thru	Peds	App. Total	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Left	Peds	App. Total	
04:00 PM	0	0	0	5	5	0	0	0	0	0	0	0	0	2	2	0	0	0	1	1	8
04:15 PM	0	0	0	3	3	0	0	0	0	0	0	0	0	4	4	0	0	0	5	5	12
04:30 PM	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
04:45 PM	0	0	0	5	5	1	0	0	0	1	0	0	0	1	1	0	0	0	1	1	8
Total	0	0	0	18	18	1	0	0	0	1	0	0	0	7	7	0	0	0	7	7	33
05:00 PM	0	0	0	5	5	1	0	0	0	1	0	0	0	1	1	0	0	0	1	1	8
05:15 PM	0	0	0	8	8	7	0	0	0	7	0	0	0	2	2	0	0	0	1	1	18
05:30 PM	0	0	1	3	4	1	0	0	0	1	0	0	0	1	1	0	0	0	1	1	7
05:45 PM	0	0	3	5	8	1	0	0	0	1	0	0	0	4	4	0	0	0	4	4	17
Total	0	0	4	21	25	10	0	0	0	10	0	0	0	8	8	0	0	0	7	7	50
Grand Total	0	0	4	39	43	11	0	0	0	11	0	0	0	15	15	0	0	0	14	14	83
Apprch %	0	0	9.3	90.7		100	0	0	0		0	0	0	100		0	0	0	100		
Total %	0	0	4.8	47	51.8	13.3	0	0	0	13.3	0	0	0	18.1	18.1	0	0	0	16.9	16.9	

28 Lord Road, Suite 280  
Marlborough, MA 01752

File Name : 133646 C  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 2



28 Lord Road, Suite 280  
Marlborough, MA 01752

File Name : 133646 C  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 1

[illegible]

# MDM TRANSPORTATION CONSULTANTS, INC.

28 Lord Road, Suite 280  
Marlborough, MA 01752

S: Arlington Street  
/SW: Gas Station North/Gas Station South  
ty, State: Watertown, MA  
ient: MDM/ C. Jones

File Name : 133646 C  
Site Code : 743  
Start Date : 11/16/2013  
Page No : 1

## Groups Printed- Peds and Bikes

Start Time	Arlington Street From North					Arlington Street From South					Gas Station South Drive From Southwest					Gas Station North Drive From West					Int. Total
	Right	Bear Right	Thru	Peds	App. Total	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Left	Peds	App. Total	
1:00 AM	0	0	0	9	9	1	0	0	0	1	0	0	0	2	2	0	0	0	1	1	13
1:15 AM	0	0	0	5	5	0	0	0	0	0	0	0	0	4	4	0	0	0	4	4	13
1:30 AM	0	0	0	4	4	0	0	0	0	0	2	0	0	5	7	0	0	0	4	4	15
1:45 AM	0	0	0	4	4	0	0	0	0	0	0	0	0	3	3	0	0	0	4	4	11
Total	0	0	0	22	22	1	0	0	0	1	2	0	0	14	16	0	0	0	13	13	52
2:00 PM	0	0	1	4	5	0	0	0	0	0	0	0	0	3	3	0	0	0	2	2	10
2:15 PM	0	0	0	1	1	2	0	0	0	2	0	0	0	9	9	0	0	0	3	3	15
2:30 PM	0	0	0	4	4	3	0	0	0	3	0	0	0	5	5	0	0	0	4	4	16
2:45 PM	0	0	3	1	4	3	0	0	0	3	0	0	0	3	3	0	0	0	0	0	10
Total	0	0	4	10	14	8	0	0	0	8	0	0	0	20	20	0	0	0	9	9	51
Grand Total	0	0	4	32	36	9	0	0	0	9	2	0	0	34	36	0	0	0	22	22	103
Apprch %	0	0	11.1	88.9		100	0	0	0		5.6	0	0	94.4		0	0	0	100		
Total %	0	0	3.9	31.1	35	8.7	0	0	0	8.7	1.9	0	0	33	35	0	0	0	21.4	21.4	



□ Seasonal Data



1 Location(s)				
Loc ID	County	Community	On	From To Dir
4185	MIDDLESEX	NEWTON	YANKEE DIVISION HIGHWAY	RAMP-RT 16 WB TO RT 95 SB 2-WAY

**GRAPHREPORT OPTIONS**

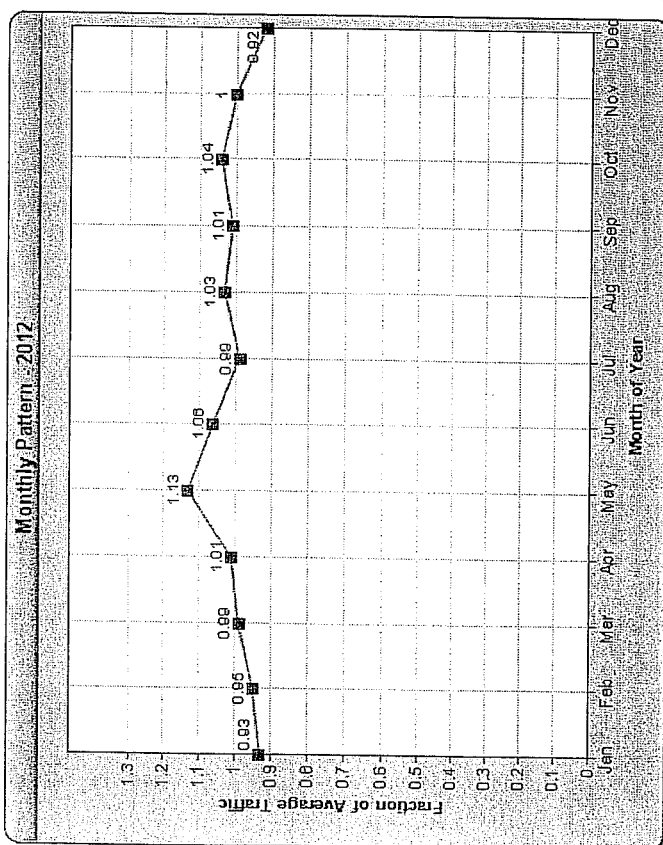
From Date: (mm/dd/yyyy) OR: Year: 2012

To Date: (mm/dd/yyyy)

Volume Speed Class Gap WIM MEPDG

Dynamic Graph Seasonal Pattern Daily Pattern (yr only) Weekly Ptn (yr only)

Monthly Ptn (yr only)



Map Tools: General Google TCDS TMC

Enter Address: Locate

Map: Lincoln

Local ID: 4165  
YANKEE DIVISION  
Located On: HIGHWAY  
Direction: 2-WAY  
Count: 15583 (2013)  
NB Count: 80823 (2013)  
SB Count: 75011 (2013)  
SF Group: 8 View Graph  
AF Group: 4 View Graph  
View Detail

155,834 (13)  
157,008 (13)  
146,683 (12)  
151,851 (12)  
137,285 (12)  
139,953 (12)

Newton  
Newton Centre  
Newton Highlands  
Woburn  
Wellesley Hills  
Wellesley  
Needham Heights  
Needham  
West Roxbury  
Boston  
Waltham  
Newton  
Dorchester  
Dorchester Heights  
Dorchester Center  
Dorchester South  
Dorchester North  
Dorchester West  
Dorchester East  
Dorchester South  
Dorchester North  
Dorchester West  
Dorchester East

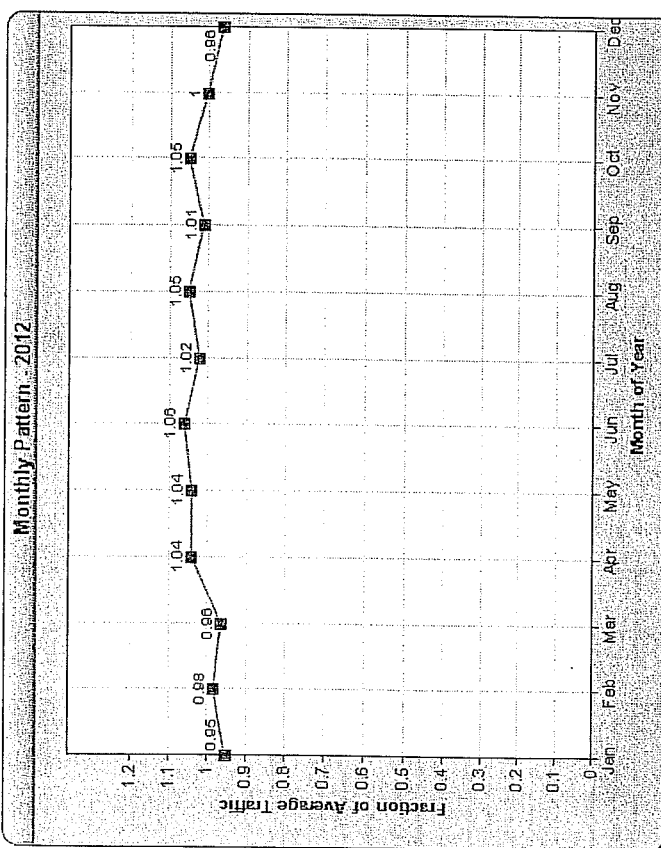
Location(s)				
Loc ID	County	Community	On	From To
82	MIDDLESEX	MEDFORD	INTERSTATE 93	STONEHAM TOWN LINE
				2-WAY

### GRAPHREPORT OPTIONS

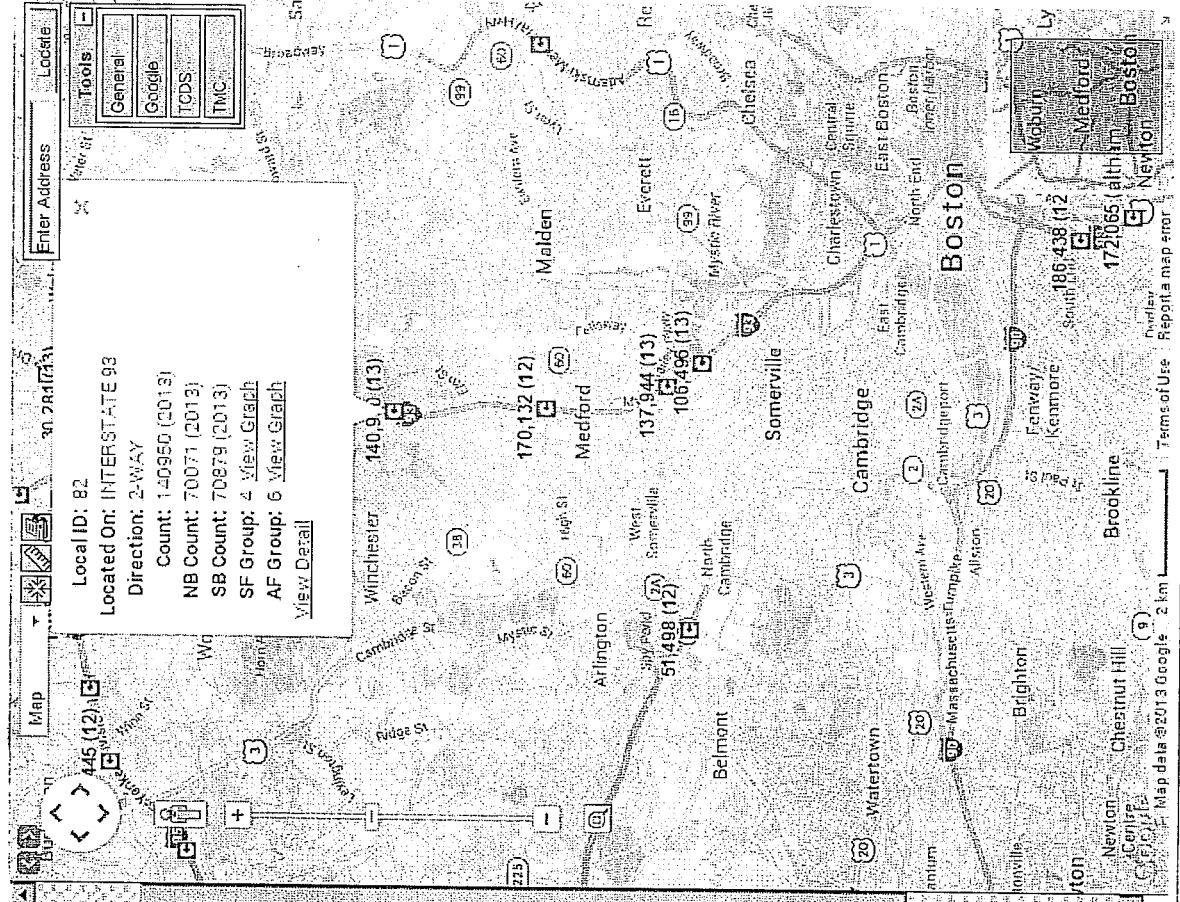
From Date:  (mm/dd/yyyy) OR:  Year:  2012  
 To Date:  (mm/dd/yyyy)

Volume:  Speed:  Class:  Gap:  WIM:  MEPRG:   
 Dynamic Graph:  Seasonal Pattern:  Daily Pattern (yr only):  Weekly Ptn (yr only):   
 Monthly Ptn (yr only):

### Volume Data



Month of Year	Average	Fraction
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		



## □ Crash Data



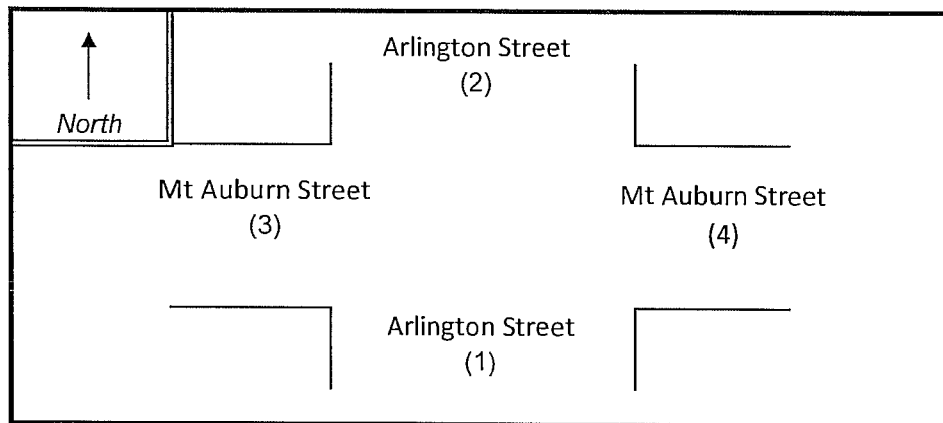
## INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : Watertown, MA COUNT DATE : Nov-13  
 DISTRICT : 6 UNSIGNALIZED : ☐ SIGNALIZED : ☒

### ~ INTERSECTION DATA ~

MAJOR STREET : Mount Auburn Street (Route 16)  
 MINOR STREET(S) : Arlington Street

**INTERSECTION  
 DIAGRAM**  
 (Label Approaches)



### PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	NB	SB	EB	WB		
PEAK HOURLY VOLUMES (PM) :	1,041	398	569	686		2,694

"K" FACTOR :

**0.090**

INTERSECTION ADT ( **V** ) = TOTAL DAILY  
 APPROACH VOLUME :

**29,933**

TOTAL # OF CRASHES :

**12**

# OF  
 YEARS :

**3**

AVERAGE # OF  
 CRASHES PER YEAR ( **A** ) :

**4.00**

**CRASH RATE CALCULATION :**

**0.37**

$$\text{RATE} = \frac{(A * 1,000,000)}{(V * 365)}$$

Comments : MassDOT District 6 Avgs: Signalized = 0.76, Unsignalized = 0.58

Project Title & Date : 743 - Watertown (Walgreens)

MassDOT MassDOT Crash Report for WATERTOWN for the year 2009																				
Crash Number	City/Town Name	Crash Date	Crash Time	Crash Severity	Number of Vehicles Involved	Number of Injuries	Number of Fatalities	Manner of Collision	Vehicle Action Prior to Crash	Vehicle Travel Direction	Lead Vehicle Details	Vehicle Configuration	Road Surface Condition	Lighting Condition	Weather Condition	Alcohol/Drugs/Impairment	Distance from Intersection	Distance from Centerline	Distance from Shoulder	Non-Motorist Type
2430243	WATERTOWN	18-Feb-2009	8:58 PM	Non-fatal injury	1	1	0	Angle	V1: Turning left	V1: Southbound	V1: Collision with pedestrian V1: Collision with motor vehicle in V2	V1: Passenger car	Wet	Dark - night	Rain		ARLINGTON STREET / MOUNT AUBURN STREET			PT Pedestrian
2453643	WATERTOWN	06-Apr-2009	9:49 AM	Property damage only (PDO)	2	0	0	Angle	V1: Traveling straight ahead / V2: Traveling straight ahead	V1: Eastbound / V2: Northbound	V1: Collision with motor vehicle in V2	V1: Passenger car / V2: Passenger car	Dry	Daylight	Cloudy		MOUNT AUBURN STREET / ARLINGTON STREET			
2490395	WATERTOWN	25-Jun-2009	3:24 PM	Property damage only (PDO)	1	0	0	Single vehicle crash	V1: Traveling straight ahead	V1: Northbound	V1: Collision with curb	V1: Passenger car	Dry	Dark - night	Clear		ARLINGTON STREET / MOUNT AUBURN STREET			
2501272	WATERTOWN	04-Dec-2009	00:00 AM	Property damage only (PDO)	1	0	0	Single vehicle crash	V1: Turning left	V1: Eastbound	V1: Collision with object (wall, building, fence, etc.)	V1: Passenger car	Dry	Dark - night	Clear		MOUNT AUBURN STREET / ARLINGTON STREET			
2550195	WATERTOWN	24-Dec-2009	1:00 PM	Non-fatal injury	1	1	0	Single vehicle crash	V1: Turning left	V1: Eastbound	V1: Collision with pedestrian	V1: Passenger car	Dry	Daylight	Clear		ARLINGTON STREET / MOUNT AUBURN STREET			PT Pedestrian



MassDOT Crash Report for WATERTOWN for the year 2011																										
Crash Number	City/Town Name	Crash Date	Crash Time	Crash Event	Number of Vehicles Involved	Total Injuries	Number of Deaths	Vehicle Action Prior to Crash	Vehicle's Travel Direction	Most Recent Event	Vehicle Configuration	Road Surface Condition	Ambient Light	Weather Condition	At-Faulty Intersection	Location (City/Town)	County	Police Report Number	Police Report Date	Police Report Time	Police Report Location	Police Report Address	Police Report City/Town	Police Report State	Police Report Zip	Police Report Agency
214461	WATERTOWN	06-Sep-2011	4:30 PM	Non-Injury crash	1	0	0	Vehicle stopped in traffic	V1: Westbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: MOTORCYCLE	Dry	Daylight	Clear	ARLINGTON ST / MT AUBURN ST	ARLINGTON	Essex	MT AUBURN CRILL	06-Sep-2011	15:30 PM	ARLINGTON STREET / ARLINGTON STREET	ARLINGTON	MA	02132	Essex	
215926	WATERTOWN	01-Aug-2011	7:48 PM	Property damage only (non-injury)	2	0	0	V1: Stopping or stopped in traffic / V2: Traveling straight ahead	V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: PASSENGER CAR / V2: PASSENGER CAR	Dry	Daylight	Clear	MT AUBURN STREET / ARLINGTON STREET	ARLINGTON	Essex	MT AUBURN CRILL	01-Aug-2011	19:48 PM	ARLINGTON STREET / ARLINGTON STREET	ARLINGTON	MA	02132	Essex	
215919	WATERTOWN	06-Sep-2011	10:30 PM	Property damage only (non-injury)	2	0	0	V1: Stopping or stopped in traffic / V2: Traveling straight ahead	V1: Eastbound / V2: Eastbound	V1: Collision with motor vehicle in traffic / V2: Collision with motor vehicle in traffic	V1: PASSENGER CAR / V2: PASSENGER CAR	Wet	Dark - Lighted roadway	Partly Cloudy	MT AUBURN ST / ARLINGTON ST	ARLINGTON	Essex	MT AUBURN CRILL	06-Sep-2011	22:30 PM	ARLINGTON STREET / ARLINGTON STREET	ARLINGTON	MA	02132	Essex	

## □ Trip Generation Calculations



<b>Institute of Transportation Engineers (ITE) 9th Edition</b> <b>Land Use Code (LUC) 880 - Pharmacy/Drugstore without Drive-Through Window</b>
----------------------------------------------------------------------------------------------------------------------------------------------------

Average Vehicle Trips Ends vs: 1,000 Sq. Feet Gross Floor Area  
Independent Variable (X): 14.000

Pass-By: 0.53

<b>AVERAGE WEEKDAY DAILY</b>
------------------------------

T = 90.06 \* (X)  
T = 90.06 \* 14  
T = 1260.84  
T = 1,260 vehicle trips  
with 50% ( 630 vpd) entering and 50% ( 630 vpd) exiting.

<b>WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC</b>
-------------------------------------------------------------

T = 2.94 \* (X)  
T = 2.94 \* 14.0  
T = 41.16  
T = 41 vehicle trips  
with 65% ( 27 vpd) entering and 35% ( 14 vpd) exiting.

<b>WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC</b>
-------------------------------------------------------------

T = 8.40 \* (X)  
T = 8.40 \* 14.0  
T = 117.60  
T = 118 vehicle trips  
with 49% ( 58 vph) entering and 51% ( 60 vph) exiting.

<b>SATURDAY DAILY</b>
-----------------------

(Weekday Daily/Weekday PM)\*Saturday Midday

$\frac{90.06}{8.40} = \frac{y}{10.68}$  y = 115  
T = y \* (X)  
T = 1603  
with 50% ( 802 vph) entering and 50% ( 802 vph) exiting.

<b>SATURDAY MIDDAY PEAK HOUR OF GENERATOR</b>
-----------------------------------------------

T = 10.68 \* (X) (Small Sample Size - Use with Caution)  
T = 10.68 \* 0.0  
T = 149.52  
T = 150 vehicle trips  
with 49% ( 74 vph) entering and 51% ( 76 vph) exiting.

	Total	Pass-By	Net New
<b>AM</b>			
In	27	11	16
Out	<u>14</u>	<u>11</u>	<u>3</u>
Total	41	22	19
<b>PM</b>			
In	58	31	27
Out	<u>60</u>	<u>31</u>	<u>29</u>
Total	118	62	56
<b>Sat</b>			
In	74	40	34
Out	<u>76</u>	<u>40</u>	<u>36</u>
Total	150	80	70
<b>Weekday Daily</b>	1,260	668	592
<b>Saturday Daily</b>	1,603	850	753

<b>Institute of Transportation Engineers (ITE) 9th Edition</b> <b>Land Use Code (LUC) 710 - General Office Building</b>
----------------------------------------------------------------------------------------------------------------------------

Average Vehicle Trips Ends vs: Employees  
Independent Variable (X): 12

<b>AVERAGE WEEKDAY DAILY</b>
------------------------------

$$T = 3.32 * (X)$$

$$T = 3.32 * 12$$

$$T = 39.84$$

T = 40 vehicle trips

with 50% ( 20 vpd) entering and 50% ( 20 vpd) exiting.

<b>WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC</b>
-------------------------------------------------------------

$$T = 0.48 * (X)$$

$$T = 0.48 * 12$$

$$T = 5.76$$

T = 6 vehicle trips

with 88% ( 5 vph) entering and 12% ( 1 vph) exiting.

<b>WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC</b>
-------------------------------------------------------------

$$T = 0.46 * (X)$$

$$T = 0.46 * 12$$

$$T = 5.52$$

T = 6 vehicle trips

with 17% ( 1 vph) entering and 83% ( 5 vph) exiting.

<b>SATURDAY DAILY</b>
-----------------------

$$T = 0.54 * (x)$$

$$T = 0.54 * 12$$

$$T = 6.48$$

T = 6 vehicle trips

with 50% ( 3 vpd) entering and 50% ( 3 vpd) exiting.

<b>SATURDAY MIDDAY PEAK HOUR OF GENERATOR</b>
-----------------------------------------------

$$T = 0.09 * (X)$$

$$T = 0.09 * 12$$

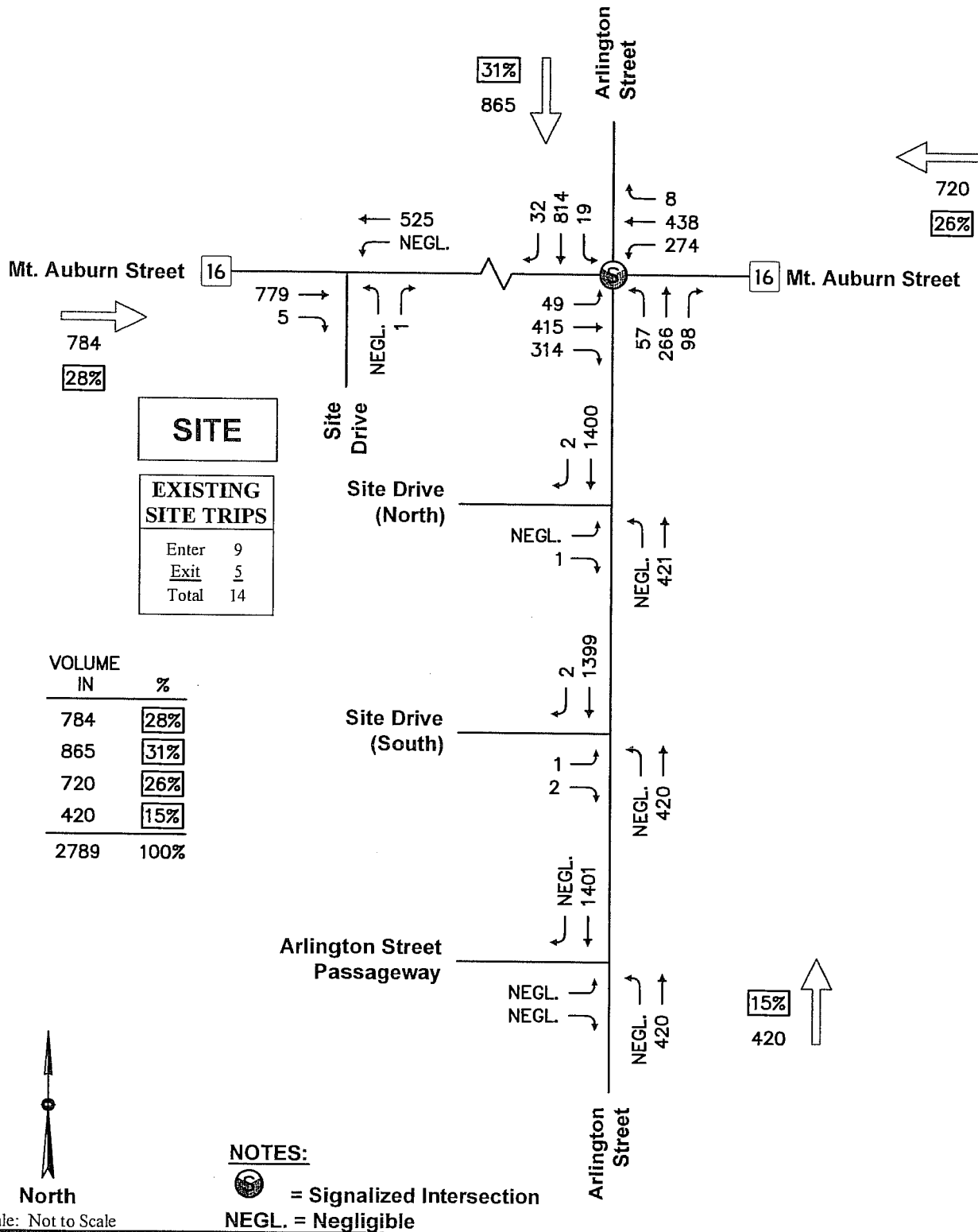
$$T = 1.08$$

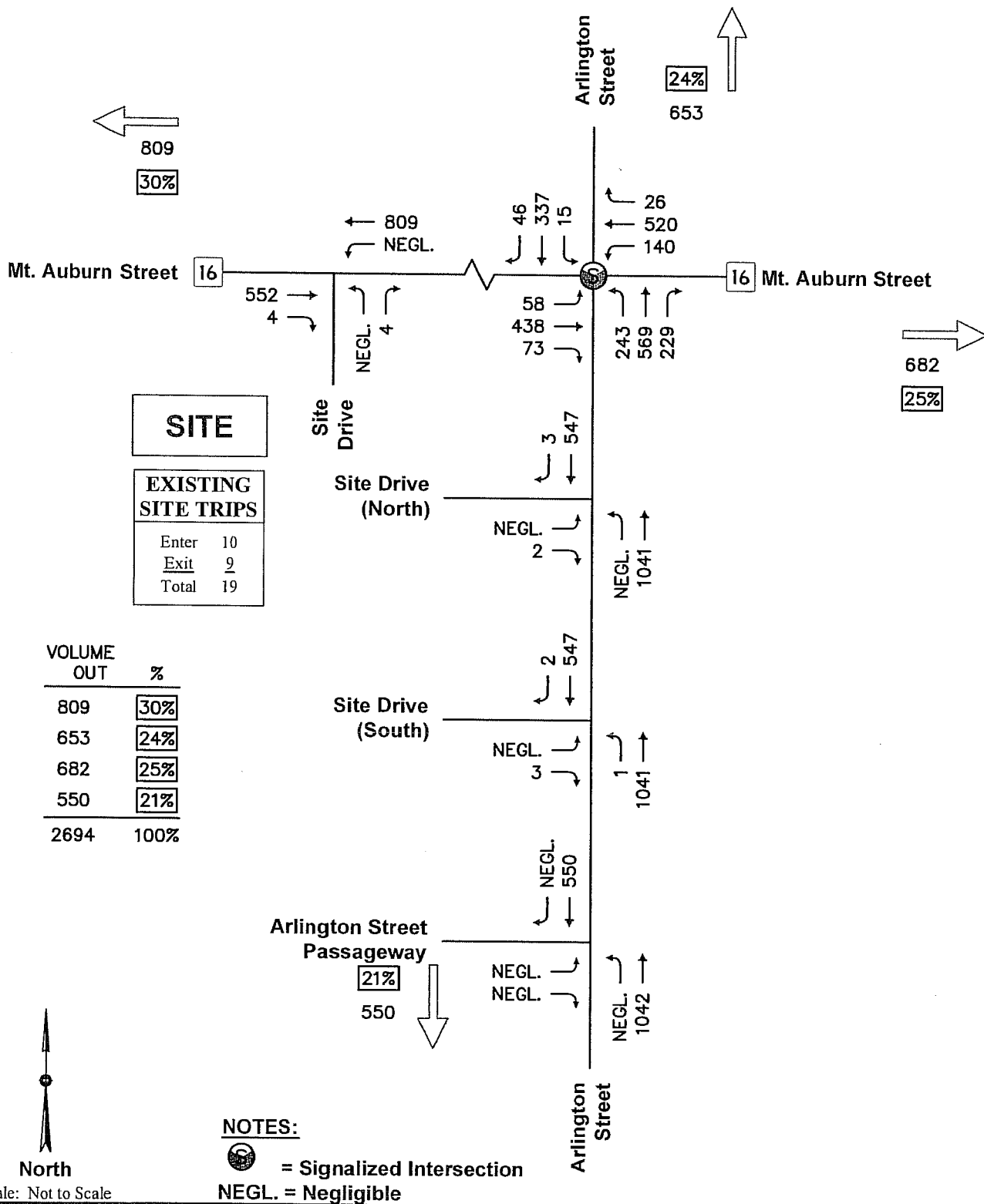
T = 1 vehicle trips

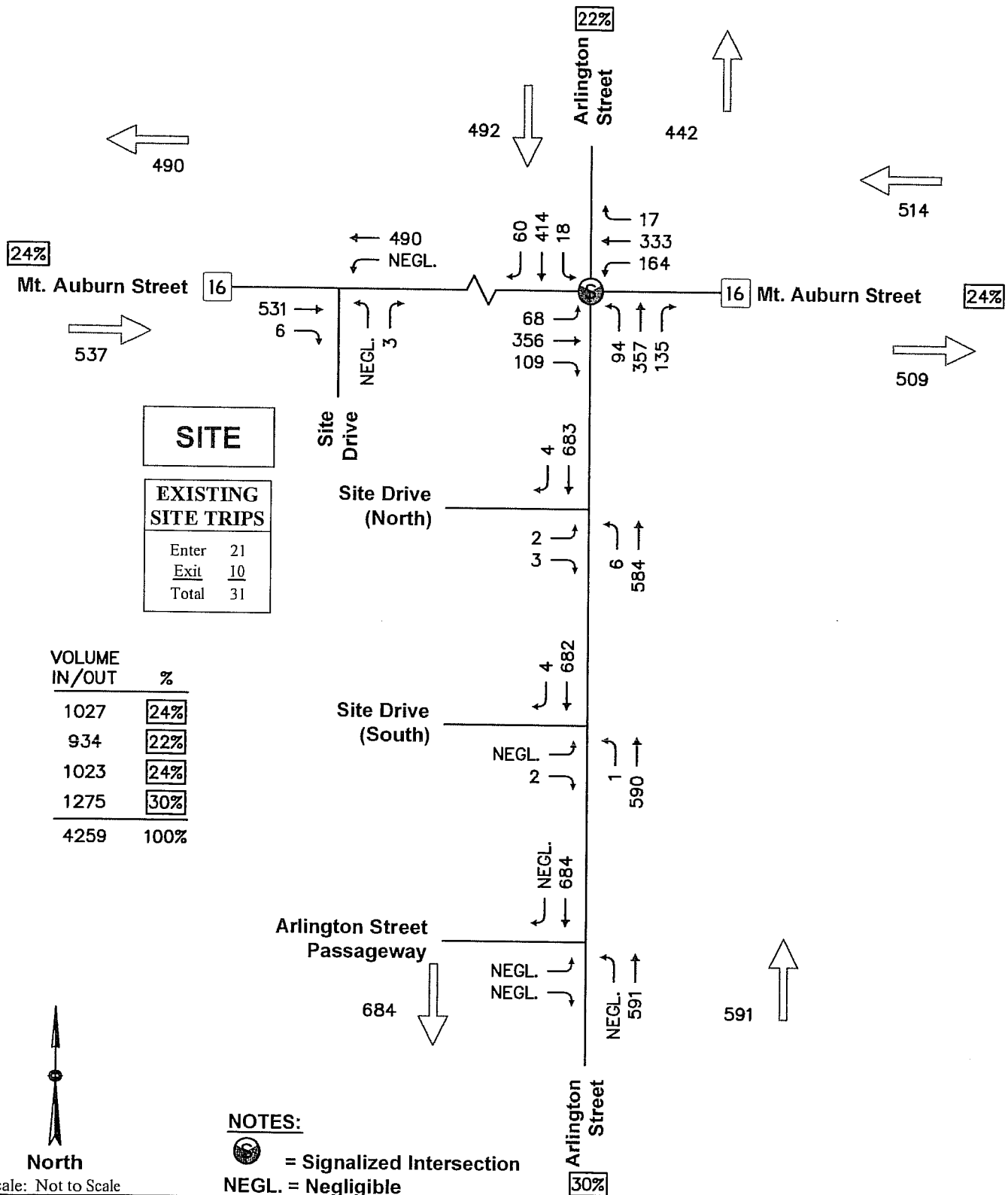
with 54% ( 1 vph) entering and 46% ( 0 vph) exiting.

## □ Trip Distribution Calculations









## Trip Distribution Calculations - Step 3 Existing Travel Patterns - Saturday Midday Peak Hour (Net New Trips)

**Trip Distribution Calculations (Net New Trips):**

**Average of Weekday Morning, Weekday Evening and Saturday Midday Peak Hours:**

**Route 16 (To/From West) =  $(28\%+30\%+24\%)/3 = 27\%$  SAY 25%**

**Arlington Street (To/From North) =  $(31\%+24\%+22\%)/3 = 26\%$  SAY 25%**

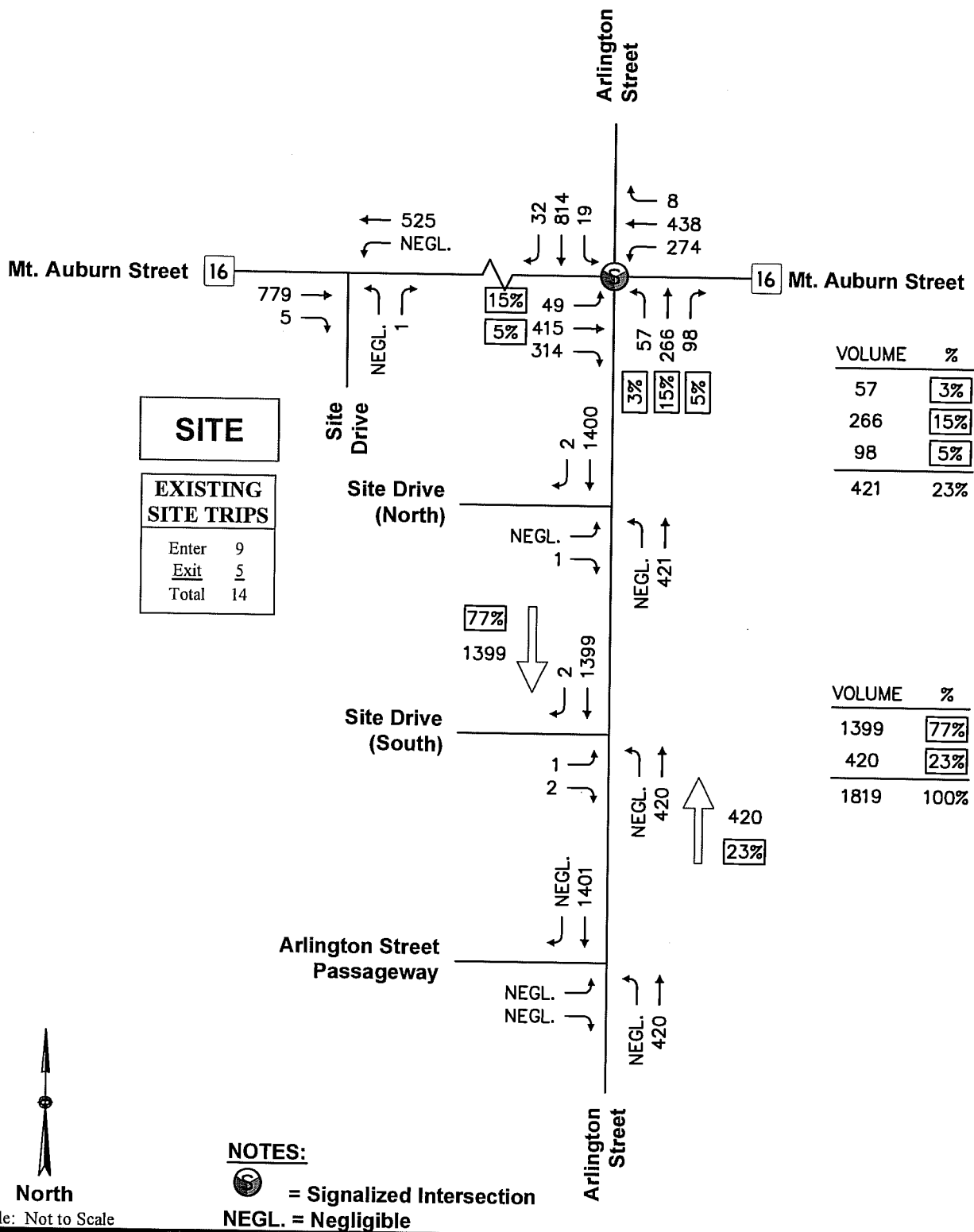
**Route 16 (To/From East) =  $(26\%+25\%+24\%)/3 = 25\%$  SAY 25%**

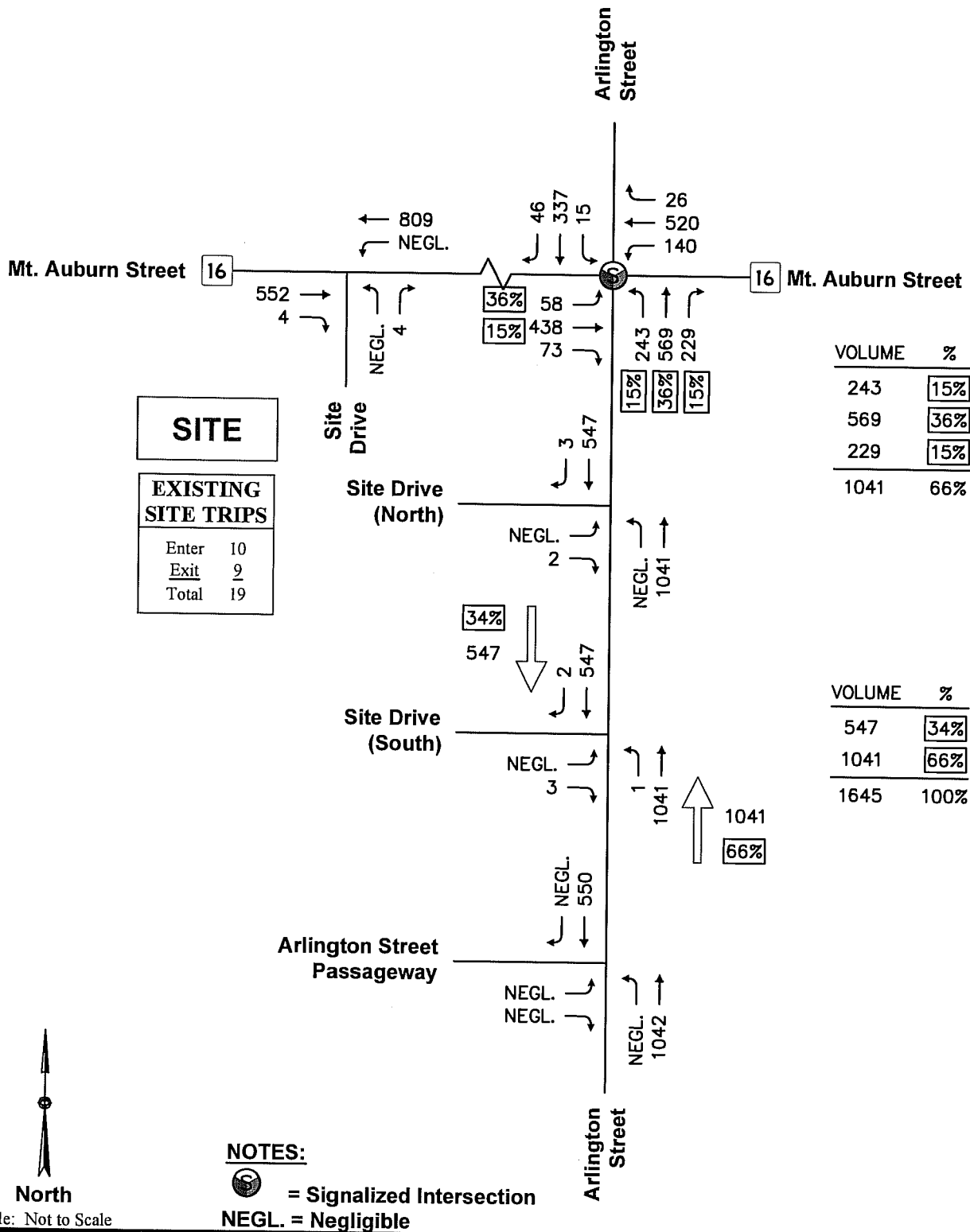
**Arlington Street (To/From South) =  $(15\%+21\%+30\%)/3 = 22\%$  SAY 25%**

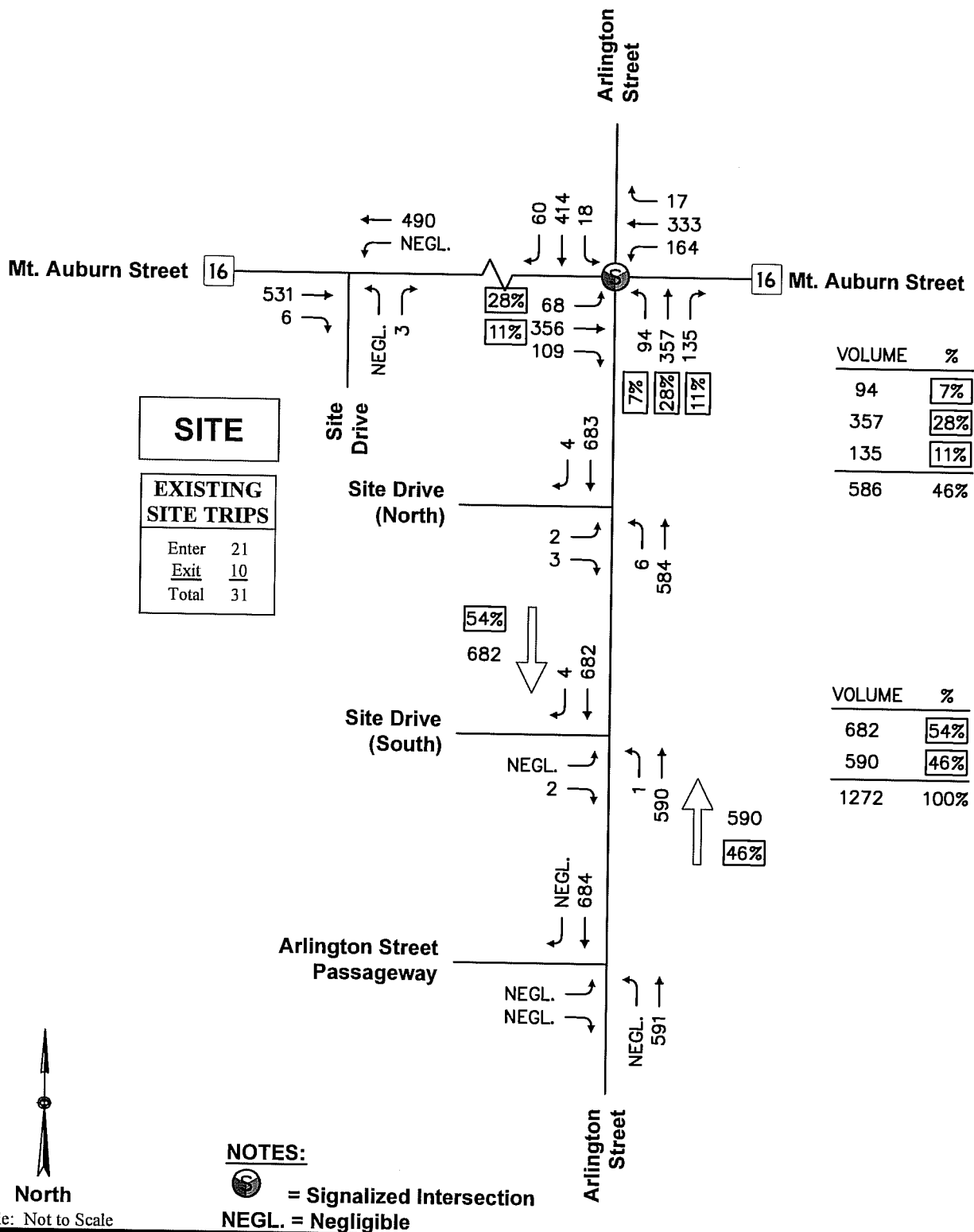


**North**

Scale: Not to Scale



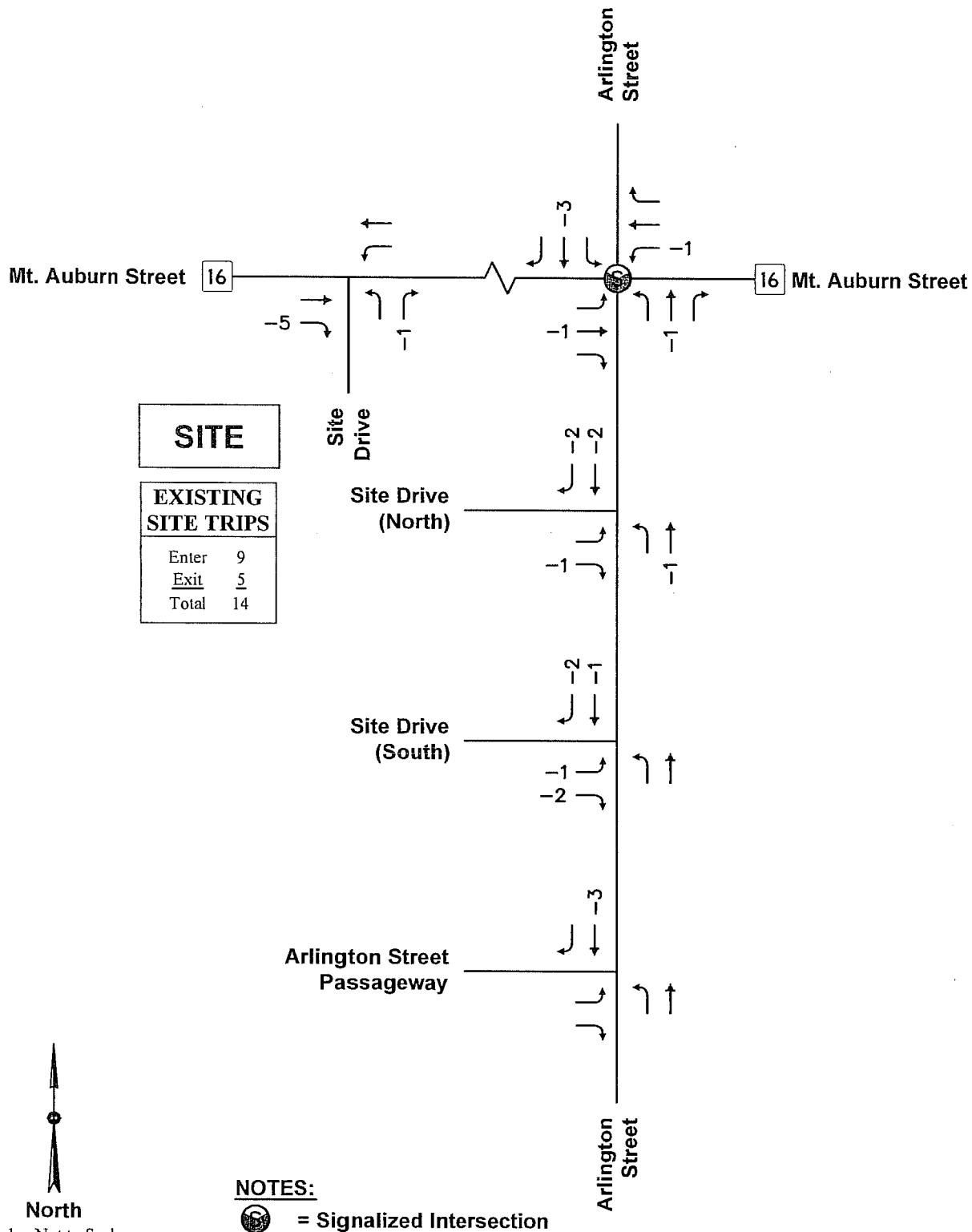




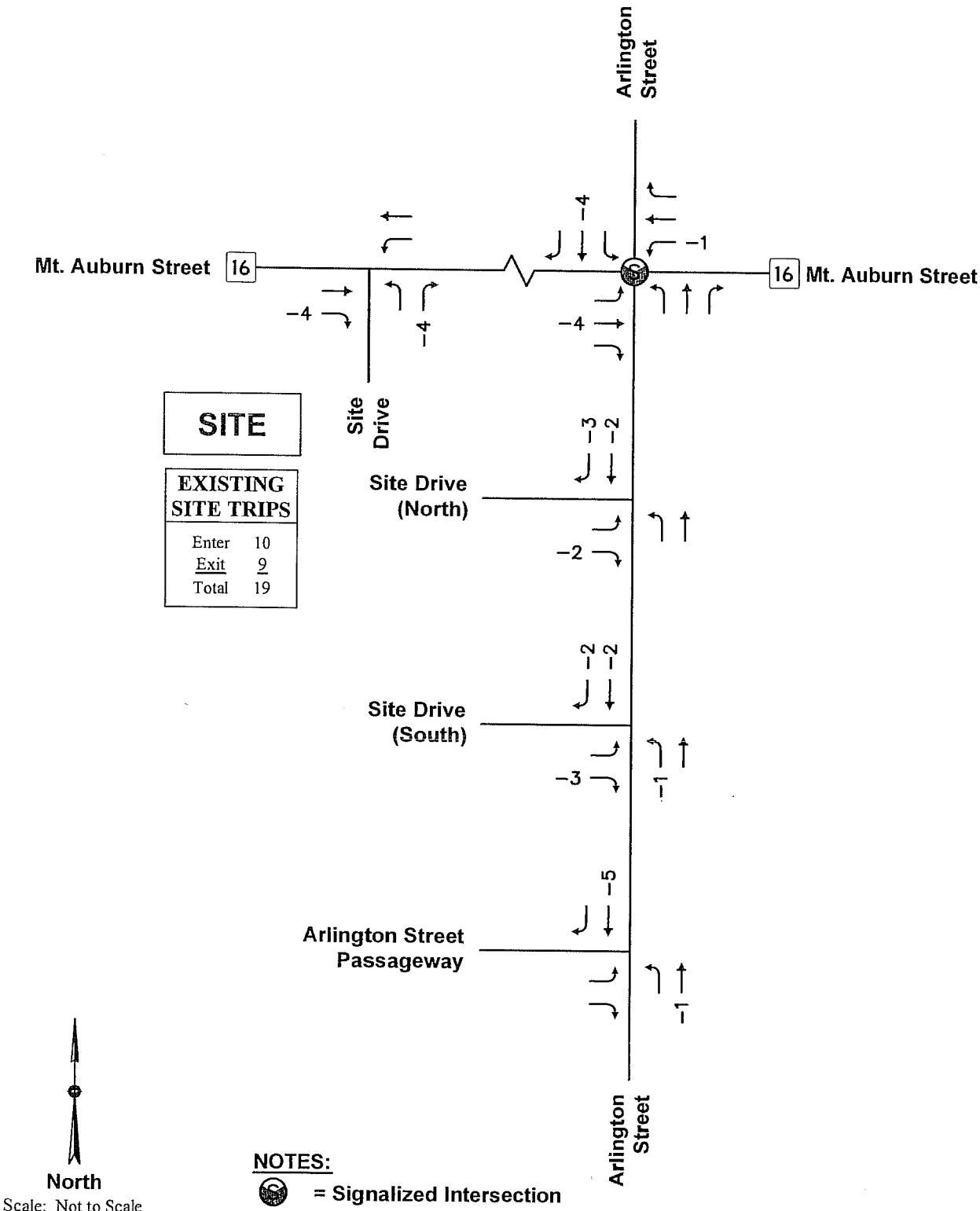


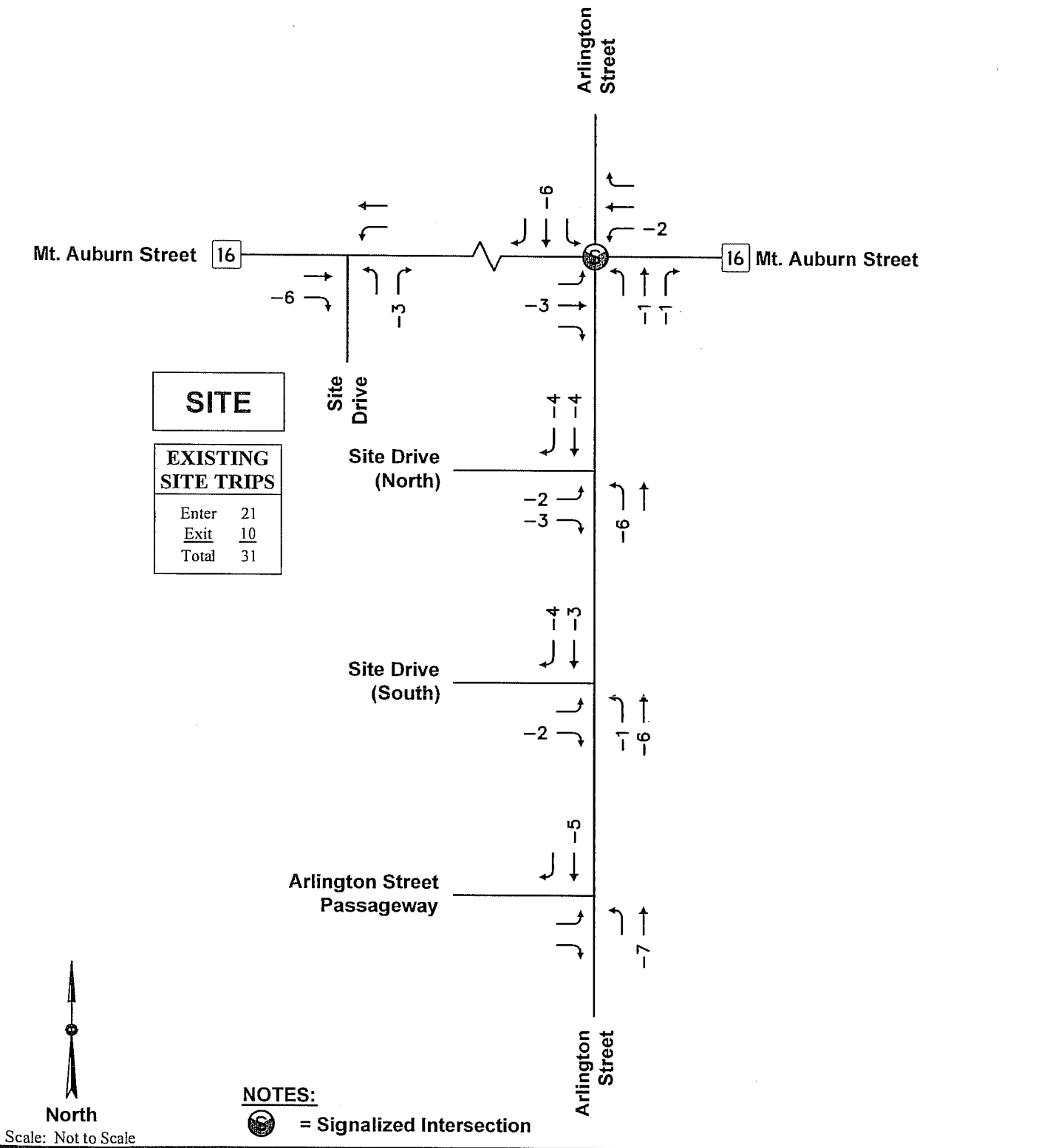
## □ Existing Site Trip Tracings





Attachments







- Capacity Analysis Worksheets



## LEVEL OF SERVICE METHODOLOGY

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements and (for signalized intersections) for the entire intersection. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements, and greater than 80 seconds for signalized movements).

### Signalized Intersection Performance Measures

The six LOS designations for signalized intersections may be described as follows:

- *LOS A* describes operations with low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than *LOS A*.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

The LOS for signalized intersections are calculated using the operational analysis methodology of the 2010 *Highway Capacity Manual*.<sup>1</sup> This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. LOS designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. **Table A1** summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

**Table A1**  
**LEVEL-OF-SERVICE CRITERIA**  
**FOR SIGNALIZED INTERSECTIONS<sup>1</sup>**

Level of Service	Control (Signal) Delay per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

<sup>1</sup>Source: *Highway Capacity Manual 2010*; Transportation Research Board; Washington, DC; 2010.

## Unsignalized Intersection Performance Measures

The six LOS designations for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The LOS designations of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual*.<sup>2</sup> LOS is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for LOS at unsignalized intersections are also given in the *Highway Capacity Manual 2010*. **Table A2** summarizes the relationship between LOS and average control delay.

**Table A2**  
**LEVEL-OF-SERVICE CRITERIA FOR**  
**UNSIGNALIZED INTERSECTIONS<sup>1</sup>**

Average Control Delay (seconds per vehicle)	Level of Service	
	$v/c \leq 1$	$v/c > 1$
$\leq 10.0$	A	F
10.1 to 15.0	B	F
15.1 to 25.0	C	F
25.1 to 35.0	D	F
35.1 to 50.0	E	F
$>50.0$	F	F



















<sup>1</sup>Source: *Highway Capacity Manual 2010*, Transportation Research Board; Washington, DC; 2010.

<sup>2</sup> *ibid*



Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	415	314	274	438	8	57	266	98	19	814	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	11	11	11
Storage Length (ft)	75		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.935			0.997			0.965			0.995	
Flt Protected	0.950			0.950				0.993			0.999	
Satd. Flow (prot)	1646	3177	0	1736	3496	0	0	3245	0	0	3351	0
Flt Permitted	0.492			0.153				0.595			0.938	
Satd. Flow (perm)	852	3177	0	280	3496	0	0	1944	0	0	3146	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			500			80	
Travel Time (s)		11.4			11.4			11.4			1.8	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	6%	4%	1%	4%	3%	0%	2%	6%	11%	5%	3%	16%
Adj. Flow (vph)	49	419	317	277	442	8	58	269	99	19	822	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	736	0	277	450	0	0	426	0	0	873	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		2		1	6		3	8			4	

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street













Existing (Baseline)  
Weekday Morning Peak Hour

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	12.0		12.0	12.0	
Total Split (s)	27.0	27.0		13.0	40.0		10.0	38.0		28.0	28.0	
Total Split (%)	26.2%	26.2%		12.6%	38.8%		9.7%	36.9%		27.2%	27.2%	
Maximum Green (s)	21.0	21.0		7.0	34.0		4.0	32.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	23.8	23.8		49.0	49.0		32.0			32.0		
Actuated g/C Ratio	0.23	0.23		0.48	0.48		0.31			0.31		
v/c Ratio	0.25	1.00		0.69	0.27		0.71			0.89		
Control Delay	36.9	74.4		37.0	19.5		38.9			46.9		
Queue Delay	0.0	0.0		0.0	0.0		0.0			0.0		
Total Delay	36.9	74.4		37.0	19.5		38.9			46.9		
LOS	D	E		D	B		D			D		
Approach Delay		72.0			26.2		38.9			46.9		
Approach LOS		E			C		D			D		
90th %ile Green (s)	21.0	21.0		7.0	34.0		0.0	32.0		32.0	32.0	
90th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Max	Max	
70th %ile Green (s)	21.0	21.0		7.0	34.0		0.0	32.0		32.0	32.0	
70th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Max	Max	
50th %ile Green (s)	30.4	30.4		22.6	59.0		0.0	32.0		32.0	32.0	
50th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Hold		Max	Max	
30th %ile Green (s)	25.8	25.8		27.2	59.0		0.0	32.0		32.0	32.0	
30th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Hold		Max	Max	
10th %ile Green (s)	21.0	21.0		32.0	59.0		0.0	32.0		32.0	32.0	
10th %ile Term Code	Coord	Coord		Max	Coord		Skip	Hold		Max	Max	
Queue Length 50th (ft)	24	233		87	71		129			286		
Queue Length 95th (ft)	63	#417		#365	163		188			#402		
Internal Link Dist (ft)		420			420		420			1		
Turn Bay Length (ft)	75			200								
Base Capacity (vph)	197	735		403	1663		603			977		
Starvation Cap Reductn	0	0		0	0		0			0		
Spillback Cap Reductn	0	0		0	0		0			0		
Storage Cap Reductn	0	0		0	0		0			0		
Reduced v/c Ratio	0.25	1.00		0.69	0.27		0.71			0.89		

### Intersection Summary

Area Type: Other

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Morning Peak Hour

Lane Group	ø9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	24%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	15
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
90th %ile Green (s)	19.0
90th %ile Term Code	Ped
70th %ile Green (s)	19.0
70th %ile Term Code	Ped
50th %ile Green (s)	0.0
50th %ile Term Code	Skip
30th %ile Green (s)	0.0
30th %ile Term Code	Skip
10th %ile Green (s)	0.0
10th %ile Term Code	Skip
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Morning Peak Hour

Cycle Length: 103

Actuated Cycle Length: 103

Offset: 28 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 47.3

Intersection LOS: D

Intersection Capacity Utilization 92.9%

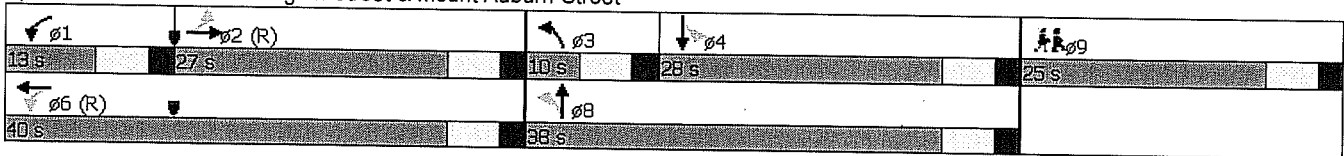
ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.




















Queue shown is maximum after two cycles.

Splits and Phases: 1: Arlington Street & Mount Auburn Street



Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	438	73	140	520	26	243	569	229	15	337	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	11	11	11
Storage Length (ft)	75		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.979			0.993			0.967			0.983	
Flt Protected	0.950			0.950				0.988			0.998	
Satd. Flow (prot)	1694	3340	0	1687	3518	0	0	3363	0	0	3331	0
Flt Permitted	0.441			0.297				0.713			0.785	
Satd. Flow (perm)	786	3340	0	527	3518	0	0	2427	0	0	2620	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			500			80	
Travel Time (s)		11.4			11.4			11.4			1.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	2%	4%	7%	2%	0%	3%	1%	6%	0%	3%	2%
Adj. Flow (vph)	60	452	75	144	536	27	251	587	236	15	347	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	527	0	144	563	0	0	1074	0	0	409	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		2		1	6		3	8			4	













Lanes, Volumes, Timings  
 1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
 Weekday Evening Peak Hour

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	12.0		12.0	12.0	
Total Split (s)	28.0	28.0		13.0	41.0		10.0	37.0		27.0	27.0	
Total Split (%)	27.2%	27.2%		12.6%	39.8%		9.7%	35.9%		26.2%	26.2%	
Maximum Green (s)	22.0	22.0		7.0	35.0		4.0	31.0		21.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	36.2	36.2		51.1	51.1			34.9			34.9	
Actuated g/C Ratio	0.35	0.35		0.50	0.50			0.34			0.34	
v/c Ratio	0.22	0.45		0.40	0.32			1.31			0.46	
Control Delay	29.1	28.6		20.2	17.5			177.7			29.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	29.1	28.6		20.2	17.5			177.7			29.6	
LOS	C	C		C	B			F			C	
Approach Delay		28.6			18.0			177.7			29.6	
Approach LOS		C			B			F			C	
90th %ile Green (s)	22.0	22.0		7.0	35.0		0.0	31.0		31.0	31.0	
90th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Hold	Hold	
70th %ile Green (s)	42.1	42.1		11.0	59.1		0.0	31.9		31.9	31.9	
70th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
50th %ile Green (s)	39.8	39.8		10.1	55.9		0.0	35.1		35.1	35.1	
50th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
30th %ile Green (s)	39.3	39.3		9.0	54.3		0.0	36.7		36.7	36.7	
30th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
10th %ile Green (s)	37.8	37.8		7.4	51.2		0.0	39.8		39.8	39.8	
10th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
Queue Length 50th (ft)	26	131		45	100			~478			109	
Queue Length 95th (ft)	75	232		118	203			#643			165	
Internal Link Dist (ft)		420			420			420			1	
Turn Bay Length (ft)	75			200								
Base Capacity (vph)	276	1173		361	1745			822			887	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.22	0.45		0.40	0.32			1.31			0.46	

Intersection Summary

Area Type: Other

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Evening Peak Hour

Lane Group	ø9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	24%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	11
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
90th %ile Green (s)	19.0
90th %ile Term Code	Ped
70th %ile Green (s)	0.0
70th %ile Term Code	Skip
50th %ile Green (s)	0.0
50th %ile Term Code	Skip
30th %ile Green (s)	0.0
30th %ile Term Code	Skip
10th %ile Green (s)	0.0
10th %ile Term Code	Skip
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Weekday Evening Peak Hour

Cycle Length: 103

Actuated Cycle Length: 103

Offset: 28 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.31

Intersection Signal Delay: 83.7

Intersection Capacity Utilization 83.5%








Analysis Period (min) 15

Intersection LOS: F

ICU Level of Service E



















- ~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Splits and Phases: 1: Arlington Street & Mount Auburn Street

 Ø1	 Ø2 (R)	 Ø3	 Ø4	 Ø9
13 s	28 s	10 s	27 s	25 s
 Ø6 (R)		 Ø8		
41 s		37 s		

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Saturday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	68	356	109	164	333	17	94	357	135	18	414	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	11	11	11
Storage Length (ft)	75		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.965			0.993			0.965			0.982	
Flt Protected	0.950			0.950				0.992			0.998	
Satd. Flow (prot)	1694	3317	0	1770	3518	0	0	3414	0	0	3391	0
Flt Permitted	0.536			0.322				0.693			0.916	
Satd. Flow (perm)	956	3317	0	600	3518	0	0	2385	0	0	3113	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			500			80	
Travel Time (s)		11.4			11.4			11.4			1.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%	1%	1%	2%	0%	1%	0%
Adj. Flow (vph)	70	367	112	169	343	18	97	368	139	19	427	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	479	0	169	361	0	0	604	0	0	508	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		2		1	6		3	8			4	

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Saturday Middy Peak Hour













Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Existing (Baseline)

Saturday MIDDAY Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	12.0		12.0	12.0	
Total Split (s)	25.0	25.0		13.0	38.0		10.0	40.0		30.0	30.0	
Total Split (%)	24.3%	24.3%		12.6%	36.9%		9.7%	38.8%		29.1%	29.1%	
Maximum Green (s)	19.0	19.0		7.0	32.0		4.0	34.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	33.9	33.9		48.5	48.5			32.5			32.5	
Actuated g/C Ratio	0.33	0.33		0.47	0.47			0.32			0.32	
v/c Ratio	0.22	0.44		0.44	0.22			0.80			0.52	
Control Delay	34.1	32.3		25.5	19.9			41.3			30.7	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	34.1	32.3		25.5	19.9			41.3			30.7	
LOS	C	C		C	B			D			C	
Approach Delay		32.5			21.7			41.3			30.7	
Approach LOS		C			C			D			C	
90th %ile Green (s)	19.0	19.0		7.0	32.0		0.0	34.0		34.0	34.0	
90th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Hold	Hold	
70th %ile Green (s)	19.0	19.0		7.0	32.0		0.0	34.0		34.0	34.0	
70th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Hold	Hold	
50th %ile Green (s)	38.5	38.5		11.3	55.8		0.0	35.2		35.2	35.2	
50th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
30th %ile Green (s)	42.7	42.7		9.8	58.5		0.0	32.5		32.5	32.5	
30th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Gap		Hold	Hold	
10th %ile Green (s)	50.3	50.3		7.9	64.2		0.0	26.8		26.8	26.8	
10th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Gap		Hold	Hold	
Queue Length 50th (ft)	31	119		54	60			182			137	
Queue Length 95th (ft)	86	#223		#142	135			256			190	
Internal Link Dist (ft)		420			420			420			1	
Turn Bay Length (ft)	75			200								
Base Capacity (vph)	314	1091		380	1656			793			982	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.22	0.44		0.44	0.22			0.76			0.52	

### Intersection Summary

Area Type: Other

G:\Projects\743 - Watertown (Pharmacy)\Synchro\743 XSat.syn

MDM Transportation Consultants, Inc.

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Saturday Midday Peak Hour

Lane Group	ø9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	24%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	17
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
90th %ile Green (s)	19.0
90th %ile Term Code	Ped
70th %ile Green (s)	19.0
70th %ile Term Code	Ped
50th %ile Green (s)	0.0
50th %ile Term Code	Skip
30th %ile Green (s)	0.0
30th %ile Term Code	Skip
10th %ile Green (s)	0.0
10th %ile Term Code	Skip
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# Lanes, Volumes, Timings

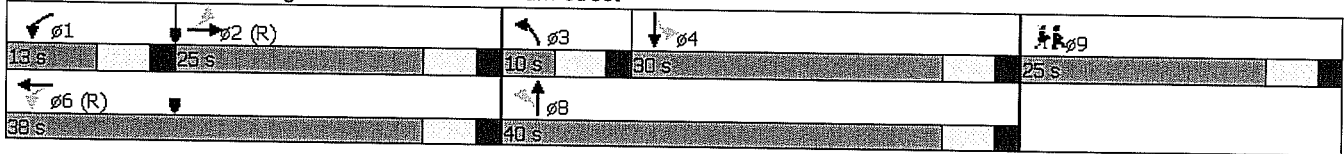
## 1: Arlington Street & Mount Auburn Street

Existing (Baseline)  
Saturday Midday Peak Hour

Cycle Length: 103  
 Actuated Cycle Length: 103  
 Offset: 28 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 31.9  
 Intersection Capacity Utilization 73.2%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Intersection LOS: C  
 ICU Level of Service D

Splits and Phases: 1: Arlington Street & Mount Auburn Street





















# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Design Year Condition

Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	416	318	277	438	8	56	264	97	19	815	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	11	11	11
Storage Length (ft)	75		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.935			0.997			0.965			0.995	
Flt Protected	0.950			0.950				0.993			0.999	
Satd. Flow (prot)	1646	3177	0	1736	3496	0	0	3244	0	0	3351	0
Flt Permitted	0.492			0.153				0.598			0.938	
Satd. Flow (perm)	852	3177	0	280	3496	0	0	1954	0	0	3146	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			500			80	
Travel Time (s)		11.4			11.4			11.4			1.8	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	6%	4%	1%	4%	3%	0%	2%	6%	11%	5%	3%	16%
Adj. Flow (vph)	52	420	321	280	442	8	57	267	98	19	823	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	741	0	280	450	0	0	422	0	0	874	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		2		1	6		3	8			4	

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Morning Peak Hour

Lane Group ø9

---

Lane Configurations  
Volume (vph)  
Ideal Flow (vphpl)  
Lane Width (ft)  
Storage Length (ft)  
Storage Lanes  
Taper Length (ft)  
Lane Util. Factor  
Frt  
Flt Protected  
Satd. Flow (prot)  
Flt Permitted  
Satd. Flow (perm)  
Right Turn on Red  
Satd. Flow (RTOR)  
Link Speed (mph)  
Link Distance (ft)  
Travel Time (s)  
Peak Hour Factor  
Heavy Vehicles (%)  
Adj. Flow (vph)  
Shared Lane Traffic (%)  
Lane Group Flow (vph)  
Enter Blocked Intersection  
Lane Alignment  
Median Width(ft)  
Link Offset(ft)  
Crosswalk Width(ft)  
Two way Left Turn Lane  
Headway Factor  
Turning Speed (mph)  
Number of Detectors  
Detector Template  
Leading Detector (ft)  
Trailing Detector (ft)  
Detector 1 Position(ft)  
Detector 1 Size(ft)  
Detector 1 Type  
Detector 1 Channel  
Detector 1 Extend (s)  
Detector 1 Queue (s)  
Detector 1 Delay (s)  
Detector 2 Position(ft)  
Detector 2 Size(ft)  
Detector 2 Type  
Detector 2 Channel  
Detector 2 Extend (s)  
Turn Type  
Protected Phases 9













---

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Design Year Condition

Weekday Morning Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	12.0		12.0	12.0	
Total Split (s)	27.0	27.0		13.0	40.0		10.0	38.0		28.0	28.0	
Total Split (%)	26.2%	26.2%		12.6%	38.8%		9.7%	36.9%		27.2%	27.2%	
Maximum Green (s)	21.0	21.0		7.0	34.0		4.0	32.0		22.0	22.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	23.7	23.7		49.0	49.0			32.0			32.0	
Actuated g/C Ratio	0.23	0.23		0.48	0.48			0.31			0.31	
v/c Ratio	0.27	1.02		0.69	0.27			0.70			0.89	
Control Delay	37.4	77.4		37.2	19.5			38.4			47.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	37.4	77.4		37.2	19.5			38.4			47.0	
LOS	D	E		D	B			D			D	
Approach Delay		74.7			26.3			38.4			47.0	
Approach LOS		E			C			D			D	
90th %ile Green (s)	21.0	21.0		7.0	34.0		0.0	32.0		32.0	32.0	
90th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Max	Max	
70th %ile Green (s)	21.0	21.0		7.0	34.0		0.0	32.0		32.0	32.0	
70th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Max	Max	
50th %ile Green (s)	30.1	30.1		22.9	59.0		0.0	32.0		32.0	32.0	
50th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Hold		Max	Max	
30th %ile Green (s)	25.4	25.4		27.6	59.0		0.0	32.0		32.0	32.0	
30th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Hold		Max	Max	
10th %ile Green (s)	21.0	21.0		32.0	59.0		0.0	32.0		32.0	32.0	
10th %ile Term Code	Coord	Coord		Max	Coord		Skip	Hold		Max	Max	
Queue Length 50th (ft)	26	236		88	71			127			287	
Queue Length 95th (ft)	67	#420		#370	163			186			#403	
Internal Link Dist (ft)		420			420			420			1	
Turn Bay Length (ft)	75			200								
Base Capacity (vph)	195	730		406	1663			607			977	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.27	1.02		0.69	0.27			0.70			0.89	

### Intersection Summary

Area Type: Other

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Morning Peak Hour

Lane Group	ø9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	24%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	15
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
90th %ile Green (s)	19.0
90th %ile Term Code	Ped
70th %ile Green (s)	19.0
70th %ile Term Code	Ped
50th %ile Green (s)	0.0
50th %ile Term Code	Skip
30th %ile Green (s)	0.0
30th %ile Term Code	Skip
10th %ile Green (s)	0.0
10th %ile Term Code	Skip
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

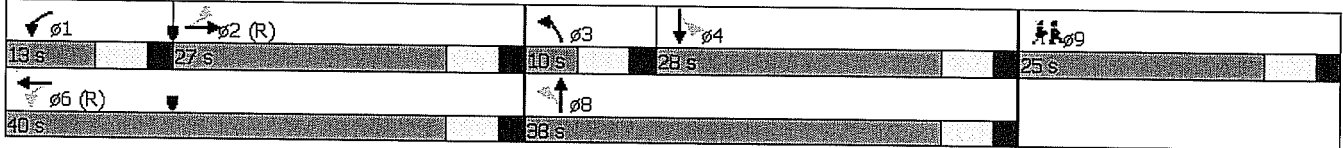
# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Morning Peak Hour



















Cycle Length: 103  
 Actuated Cycle Length: 103  
 Offset: 28 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 140  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.02  
 Intersection Signal Delay: 48.1  
 Intersection LOS: D  
 Intersection Capacity Utilization 93.2%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Arlington Street & Mount Auburn Street



Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	77	445	79	146	520	26	238	558	225	15	340	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	11	11	11
Storage Length (ft)	75		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.977			0.993			0.967			0.983	
Flt Protected	0.950			0.950				0.988			0.998	
Satd. Flow (prot)	1694	3333	0	1687	3518	0	0	3363	0	0	3331	0
Flt Permitted	0.441			0.289				0.710			0.792	
Satd. Flow (perm)	786	3333	0	513	3518	0	0	2416	0	0	2643	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			500			80	
Travel Time (s)		11.4			11.4			11.4			1.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	2%	4%	7%	2%	0%	3%	1%	6%	0%	3%	2%
Adj. Flow (vph)	79	459	81	151	536	27	245	575	232	15	351	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	540	0	151	563	0	0	1052	0	0	413	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		2		1	6		3	8			4	













Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Evening Peak Hour

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Evening Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	12.0		12.0	12.0	
Total Split (s)	28.0	28.0		13.0	41.0		10.0	37.0		27.0	27.0	
Total Split (%)	27.2%	27.2%		12.6%	39.8%		9.7%	35.9%		26.2%	26.2%	
Maximum Green (s)	22.0	22.0		7.0	35.0		4.0	31.0		21.0	21.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	36.2	36.2		51.4	51.4			34.6			34.6	
Actuated g/C Ratio	0.35	0.35		0.50	0.50			0.34			0.34	
v/c Ratio	0.29	0.46		0.42	0.32			1.30			0.47	
Control Delay	30.3	28.8		20.6	17.3			174.4			29.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	30.3	28.8		20.6	17.3			174.4			29.9	
LOS	C	C		C	B			F			C	
Approach Delay		29.0			18.0			174.4			29.9	
Approach LOS		C			B			F			C	
90th %ile Green (s)	22.0	22.0		7.0	35.0		0.0	31.0		31.0	31.0	
90th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Hold	Hold	
70th %ile Green (s)	42.2	42.2		11.4	59.6		0.0	31.4		31.4	31.4	
70th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
50th %ile Green (s)	39.9	39.9		10.5	56.4		0.0	34.6		34.6	34.6	
50th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
30th %ile Green (s)	39.3	39.3		9.4	54.7		0.0	36.3		36.3	36.3	
30th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
10th %ile Green (s)	37.7	37.7		7.8	51.5		0.0	39.5		39.5	39.5	
10th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
Queue Length 50th (ft)	35	134		47	99			~467			111	
Queue Length 95th (ft)	96	237		123	203			#627			167	
Internal Link Dist (ft)		420			420			420			1	
Turn Bay Length (ft)	75			200								
Base Capacity (vph)	276	1171		361	1757			810			886	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.29	0.46		0.42	0.32			1.30			0.47	

Intersection Summary

Area Type: Other

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Evening Peak Hour

Lane Group	ø9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	25.0
Total Split (s)	25.0
Total Split (%)	24%
Maximum Green (s)	19.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	11
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
90th %ile Green (s)	19.0
90th %ile Term Code	Ped
70th %ile Green (s)	0.0
70th %ile Term Code	Skip
50th %ile Green (s)	0.0
50th %ile Term Code	Skip
30th %ile Green (s)	0.0
30th %ile Term Code	Skip
10th %ile Green (s)	0.0
10th %ile Term Code	Skip
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Design Year Condition  
Weekday Evening Peak Hour

Cycle Length: 103

Actuated Cycle Length: 103

Offset: 28 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.30

Intersection Signal Delay: 81.0

Intersection LOS: F

Intersection Capacity Utilization 83.7%

ICU Level of Service E

Analysis Period (min) 15

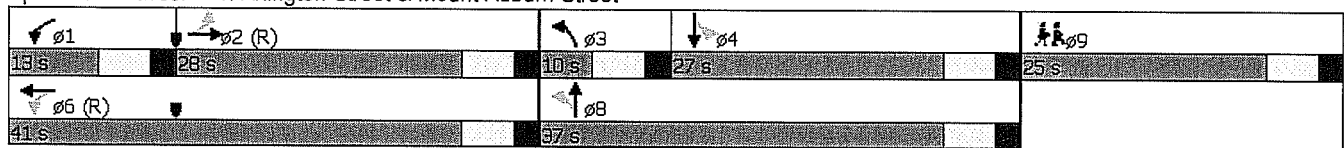
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Arlington Street & Mount Auburn Street





















# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Design Year Condition

Saturday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	367	117	171	333	17	91	345	129	18	417	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	12	12	12	11	11	11
Storage Length (ft)	75		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.964			0.993			0.966			0.982	
Flt Protected	0.950			0.950				0.992			0.998	
Satd. Flow (prot)	1694	3314	0	1770	3518	0	0	3417	0	0	3391	0
Flt Permitted	0.536			0.310				0.689			0.918	
Satd. Flow (perm)	956	3314	0	577	3518	0	0	2374	0	0	3120	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			500			80	
Travel Time (s)		11.4			11.4			11.4			1.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	2%	0%	2%	2%	0%	1%	1%	2%	0%	1%	0%
Adj. Flow (vph)	91	378	121	176	343	18	94	356	133	19	430	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	499	0	176	361	0	0	583	0	0	511	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		2		1	6		3	8			4	

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street













Design Year Condition  
Saturday Midday Peak Hour

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Design Year Condition  
Saturday Midday Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0		4.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	12.0		12.0	12.0	
Total Split (s)	25.0	25.0		13.0	38.0		10.0	40.0		30.0	30.0	
Total Split (%)	24.3%	24.3%		12.6%	36.9%		9.7%	38.8%		29.1%	29.1%	
Maximum Green (s)	19.0	19.0		7.0	32.0		4.0	34.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0			6.0			6.0	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		None	C-Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	34.1	34.1		49.2	49.2			31.8			31.8	
Actuated g/C Ratio	0.33	0.33		0.48	0.48			0.31			0.31	
v/c Ratio	0.29	0.45		0.46	0.22			0.80			0.53	
Control Delay	35.0	32.5		26.1	19.6			41.3			31.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	35.0	32.5		26.1	19.6			41.3			31.3	
LOS	C	C		C	B			D			C	
Approach Delay		32.9			21.7			41.3			31.3	
Approach LOS		C			C			D			C	
90th %ile Green (s)	19.0	19.0		7.0	32.0		0.0	34.0		34.0	34.0	
90th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Hold	Hold	
70th %ile Green (s)	19.0	19.0		7.0	32.0		0.0	34.0		34.0	34.0	
70th %ile Term Code	Coord	Coord		Max	Coord		Skip	Max		Hold	Hold	
50th %ile Green (s)	38.7	38.7		12.1	56.8		0.0	34.2		34.2	34.2	
50th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Max		Hold	Hold	
30th %ile Green (s)	43.0	43.0		10.6	59.6		0.0	31.4		31.4	31.4	
30th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Gap		Hold	Hold	
10th %ile Green (s)	50.8	50.8		8.6	65.4		0.0	25.6		25.6	25.6	
10th %ile Term Code	Coord	Coord		Gap	Coord		Skip	Gap		Hold	Hold	
Queue Length 50th (ft)	41	125		55	58			177			140	
Queue Length 95th (ft)	109	#244		#158	135			245			192	
Internal Link Dist (ft)		420			420			420			1	
Turn Bay Length (ft)	75			200								
Base Capacity (vph)	316	1097		380	1678			784			964	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.29	0.45		0.46	0.22			0.74			0.53	

### Intersection Summary

Area Type: Other

Lanes, Volumes, Timings  
1: Arlington Street & Mount Auburn Street

Design Year Condition  
Saturday Midday Peak Hour

Lane Group ø9

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 7.0

Minimum Split (s) 25.0

Total Split (s) 25.0

Total Split (%) 24%

Maximum Green (s) 19.0

Yellow Time (s) 4.0

All-Red Time (s) 2.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0

Recall Mode None

Walk Time (s) 7.0

Flash Dont Walk (s) 12.0

Pedestrian Calls (#/hr) 17

Act Effct Green (s)

Actuated g/C Ratio

v/c Ratio

Control Delay

Queue Delay

Total Delay

LOS

Approach Delay

Approach LOS

90th %ile Green (s) 19.0

90th %ile Term Code Ped

70th %ile Green (s) 19.0

70th %ile Term Code Ped

50th %ile Green (s) 0.0

50th %ile Term Code Skip

30th %ile Green (s) 0.0

30th %ile Term Code Skip

10th %ile Green (s) 0.0

10th %ile Term Code Skip

Queue Length 50th (ft)

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

# Lanes, Volumes, Timings

## 1: Arlington Street & Mount Auburn Street

Design Year Condition  
Saturday Midday Peak Hour

Cycle Length: 103

Actuated Cycle Length: 103

Offset: 28 (27%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 32.0

Intersection LOS: C

Intersection Capacity Utilization 73.6%








ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Arlington Street & Mount Auburn Street

 Ø1	 Ø2 (R)	 Ø3	 Ø4	 Ø9
19 s	25 s	10 s	30 s	25 s
 Ø6 (R)		 Ø8		
30 s		40 s		